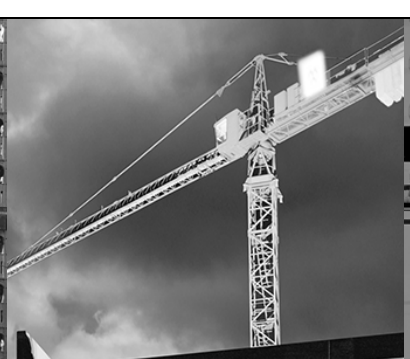
SEW EURODRIVE

Operating Instructions

MOVIDRIVE® MDX60B / 61B

Edition 01/2010

16837614 / EN



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1 General Information

1.1 How to use the operating instructions

The operating instructions are an integral part of the product and contain important information for operation and service. The operating instructions are written for all employees who assemble, install, startup, and service this product.

The operating instructions must be legible and accessible at all times. Make sure that staff responsible for the plant and its operation, as well as persons who work independently on the unit, have read the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

The safety notes in these operating instructions are designed as follows:

Pictogram	⚠ SIGNAL WORD
	Type and source of danger. Possible consequence(s) if disregarded. • Measure(s) to prevent the danger.

Pictogram	Signal word	Meaning	Consequences if disregarded
Example: General danger Specific danger, e.g. electric shock	⚠ **DANGER**	Imminent danger	Severe or fatal injuries
	⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries
	⚠ **CAUTION**	Possible dangerous situation	Minor injuries
	NOTICE	Possible damage to property	Damage to the drive system or its environment
	INFORMATION	Useful information or tip. Simplifies the handling of the drive system.	

1.3 Rights to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the operating instructions. Therefore, read the operating instructions before you start working with the unit.

1.4 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the MOVIDRIVE® MDX60B/61B inverters and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE does not assume liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

1.5 Copyright notice

© 2009 – SEW-EURODRIVE. All rights reserved.

Copyright law prohibits the unauthorized duplication, modification, distribution, and use of this document, in whole or in part.

2 Safety Notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and observed. Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, please contact SEW-EURODRIVE.

2.1 General information

Never install or start up damaged products. Submit a complaint to the shipping company immediately in the event of damage.

During operation, drive inverters can have live, bare and movable or rotating parts as well as hot surfaces, depending on their degree of protection.

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property.

Refer to the documentation for additional information.

2.2 Target group

Only qualified electricians are authorized to install, startup or service the units or correct unit faults (observing IEC 60364 or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 as well as national accident prevention guidelines).

Qualified personnel in the context of these basic safety notes are: All persons familiar with installation, assembly, startup and operation of the product who possess the necessary qualifications.

Any activities regarding transportation, storage, operation, and disposal must be carried out by persons who have been instructed appropriately.

2.3 Designated use

Drive inverters are components intended for installation in electrical systems or machines.

In case of installation in machines, startup of the drive inverters (meaning the start of proper use) is prohibited until it is determined that the machine meets the requirements stipulated in the EC Directive 98/37/EC (machine guideline); observe EN 60204.

Startup (i.e. the start of designated use) is only permitted under observance of the EMC (2004/108/EC) directive.

The drive inverters meet the requirements stipulated in low voltage guideline 2006/95/EC. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these drive inverters.

You must observe the technical data and information on the connection requirements as provided on the nameplate and in the documentation.

2.3.1 Safety functions

MOVIDRIVE® MDX60/61B inverters may not perform safety functions without higher-level safety systems. Use higher-level safety systems to ensure protection of equipment and personnel.

For safety applications, refer to the information in the following publications:

- Safe disconnection for MOVIDRIVE® MDX60B/61B – Conditions
- Safe disconnection for MOVIDRIVE® MDX60B/61B – Applications

2.4 Transportation, storage

Observe the notes on transportation, storage and proper handling. Observe the climatic conditions as stated in the section "General technical data".

2.5 Installation

The units must be installed and cooled according to the regulations and specifications in the corresponding documentation.

Protect the drive inverters from excessive strain. Ensure that components are not deformed and/or insulation spaces are maintained, particularly during transportation. Avoid contact with electronic components and contacts.

Drive inverters contain components that can be damaged by electrostatic energy and improper handling. Prevent mechanical damage or destruction of electric components (may pose health risk)

The following applications are prohibited unless the unit is explicitly designed for such use:

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications which are subject to mechanical vibration and impact loads in excess of the requirements in EN 61800-5-1.

2.6 Electrical connection

Observe the applicable national accident prevention guidelines when working on live drive inverters (for example, BGV A3).

Electrical installation is to be carried out in compliance with pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.

You will find notes on EMC compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, in the documentation of the drive inverters. Always observe these notes even with drive inverters bearing the CE marking. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

Protective measures and protection devices must comply with the regulations in force (e.g. EN 60204 or EN 61800-5-1).

Required preventive measure: Grounding the unit.

MOVIDRIVE® B, size 7 has an additional display LED under the lower front cover. The lit display LED indicates a DC link voltage. Do not touch power connections. Check that there is no voltage present before touching power connections even if the LED display indicates that there is no voltage.

2.7 Safe disconnection

The unit meets all requirements for safe disconnection of power and electronic connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection.

2.8 Operation

Systems with integrated drive inverters must be equipped with additional monitoring and protection devices, if necessary, according to the applicable safety guidelines, such as legislation governing technical equipment, accident prevention regulations, etc. The operating software may be used to make changes to the drive inverter.

Do not touch live components or power connections immediately after disconnecting the drive inverters from the supply voltage because there may still be some charged capacitors. Note the respective reference plates on the drive inverter.

Keep all covers and doors closed during operation.

The fact that the status LED and other display elements (such as the display LED on size 7 units) are no longer illuminated does not indicate that the unit has been disconnected from the power supply and no longer carries any voltage.

Check that there is no voltage present before touching power connections even if the LED display indicates that there is no voltage.

Mechanical blocking or internal safety functions of the unit can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive restarting automatically. If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the supply system before correcting the error.

3 Unit Structure

3.1 Unit designation, nameplates and scope of delivery

3.1.1 Example: Unit designation

MDX60 B 0011 - 5 A 3 - 4 00

Type	00 = Standard 0T = Application XX = Special unit XX/L = Coated pcbs
Quadrants	4 = 4Q (with brake chopper) 2 = 2Q
Connection type	3 = 3-phase
Radio interference suppression on the line side	B = Radio interference suppression C1 A = Radio interference suppression C2 0 = No radio interference suppression
Supply voltage	5 = AC 380 ... 500 V 2 = AC 200 ... 230 V
Recommended motor power	0011 = 1.1 kW
Version B	
Series	60 = No options can be installed 61 = Options can be installed

3.1.2 Example: System nameplate size 0

The **system nameplate** for MDX60B/61B.. size 0 is attached to the side of the unit.

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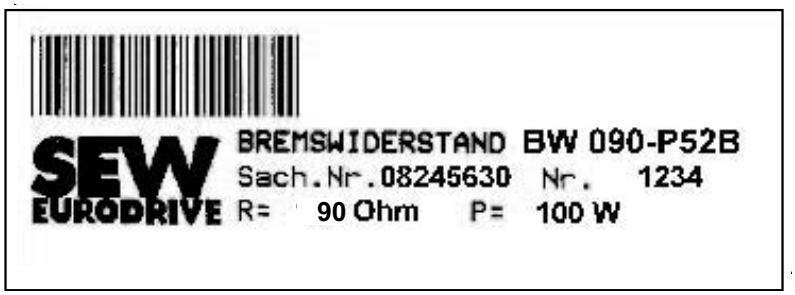
3.1.3 Example: Nameplate for BW090-P52B braking resistor

The braking resistor BW090-P52B is only available for MDX60B/61B size 0.



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3.1.4 Example: System nameplate for sizes 1 - 7

The **system nameplate** is attached to MDX61B.. as follows:

- On the side of the units of size 1- 6
- On the upper front cover of size 7

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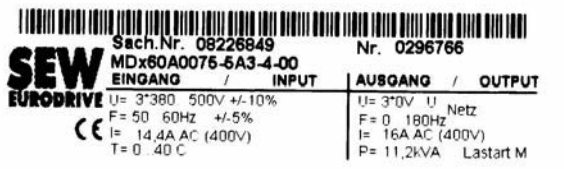
3.1.5 Example: Nameplate for power section sizes 1 - 7

The **power section nameplate** is attached to MDX61B.. as follows:

- On the side of the units of size 1- 6
- Top left inside the size 7 unit



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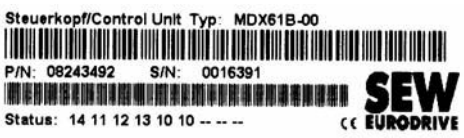
3.1.6 Example: Nameplate for control unit sizes 1 - 7

The **control unit nameplate** is attached to the front of MDX61B.. size 1 - 7.



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3.1.7 Example: Option card nameplate

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3.2 Scope of delivery

3.2.1 Sizes 0 – 7

- Connector housing for all signal terminals (X10 ... X17), connected
- Connector housing for the power terminals (X1 ... X4), connected
- Pluggable memory card, connected

3.2.2 Size 0

- 1 set of shield clamps for power cable and signal cable, not installed. The set of shield clamps comprises:
  - 2 shield clamps for power cable (2 contact clips each)
  - 1 shield clamp for signal cable (1 contact clip) for MDX60B
  - 1 shield clamp for signal cable (2 contact clips) for MDX61B
  - 6 contact clips
  - 6 screws for attaching the contact clips
  - 3 screws for attaching the contact clips to the unit

3.2.3 Size 1 - 7

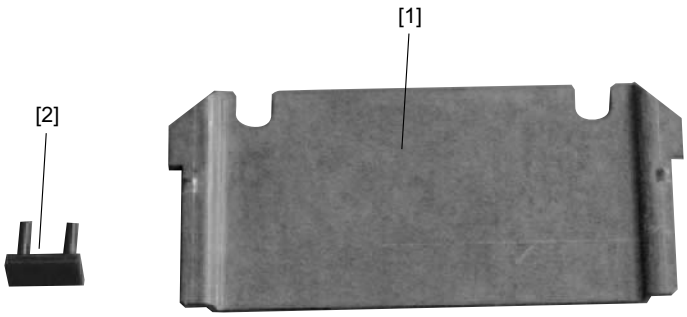
- 1 set of shield clamps for signal cable, not installed. The set of shield clamps comprises:
  - 1 shield clamp for signal cable (1 contact clip)
  - 2 contact clips
  - 2 screws for attaching the contact clips
  - 1 screw for attaching the shield clamp to the unit
- Only for size 6: Carrying bar and 2 split pins
- For size 7, you can order the connection set DLA11B (part no. 18223125) with connection screws and 3 PE terminals.

3.2.4 Size 2S

- Accessories set, not installed. The accessories set (→ following figure) comprises:
  - 2 mounting feet [1] to be plugged into the heat sink
  - 2 touch guards [2] to be fastened to terminals X4: $-U_Z$/$+U_Z$ and -X3:-R(8)/+R(9).

  Degree of protection IP20 is achieved as soon as one of the following conditions is fulfilled:
  - Touch guard [2] mounted to X3/X4 (→ section "Touch guard")
  - An adequately prefabricated cable is connected to X3/X4

    If neither of the two conditions is fulfilled, the degree of protection is IP10.



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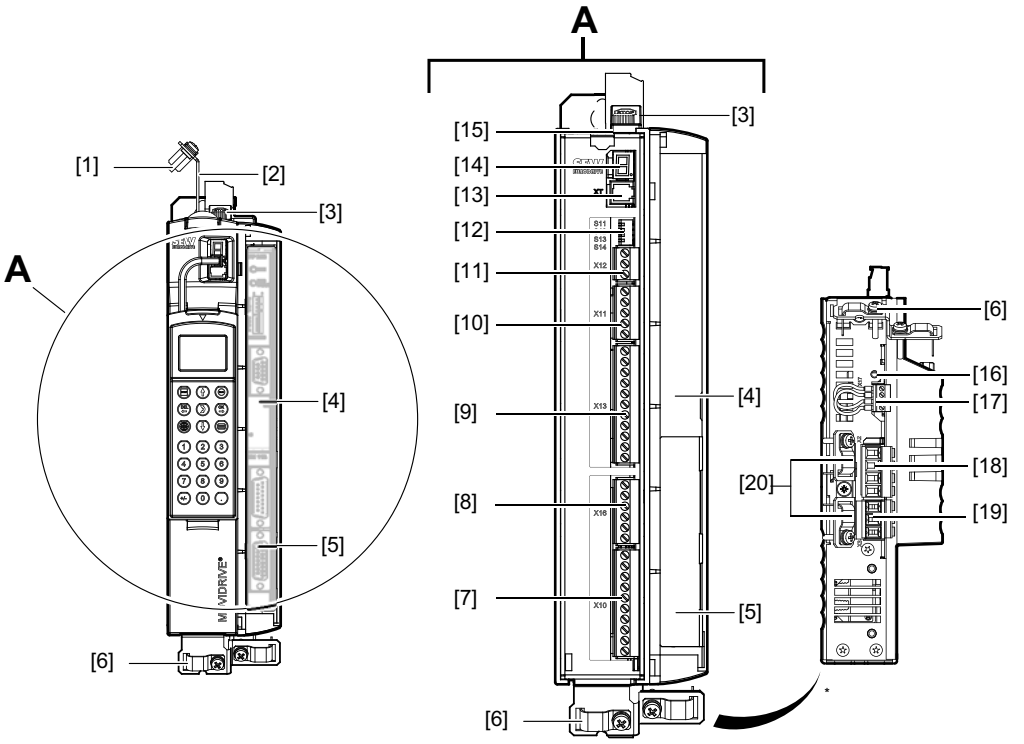
3.3 Size 0

MDX60/61B-5A3 (AC 400/500 V units): 0005 / 0008 / 0011 / 0014



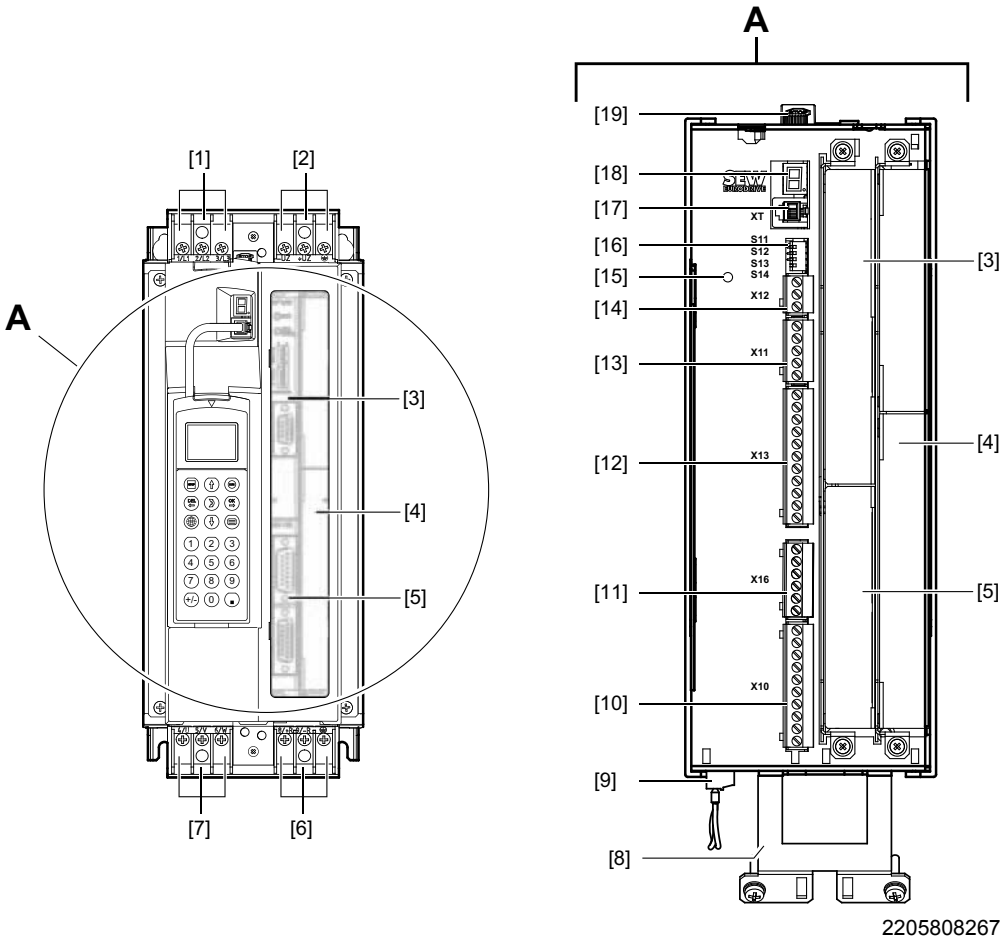
* View of the underside of the unit

[1] Power shield clamp for supply system connection and DC link connection
[2] X4: Connection for DC link connection $-U_Z$ / $+U_Z$ and PE connection, separable
[3] X1: Power supply connection L1, L2, L3 and PE connection, separable
[4] Only with MDX61B: Fieldbus port
[5] Only with MDX61B: Encoder slot
[6] Shield clamp for signal cables MDX61B size 0
[7] X10: Signal terminal strip for binary outputs and TF/TH input
[8] X16: Signal terminal strip binary inputs and outputs
[9] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[10] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[11] X12: Signal terminal strip system bus (SBus)
[12] DIP switches S11 ... S14
[13] XT: Slot for DBG60B keypad or UWS21B serial interface
[14] 7-segment display
[15] Memory card
[16] Grounding screw M4 × 14
[17] X17: Signal terminal strip for safety contacts for safe stop
[18] X2: Motor connection U, V, W and PE connection, separable
[19] X3: Braking resistor connection +R / –R and PE connection, separable
[20] Power shield clamp for motor connection and braking resistor connection

3.4 Size 1

MDX61B-5A3 (AC 400/500 V units): 0015 / 0022 / 0030 / 0040

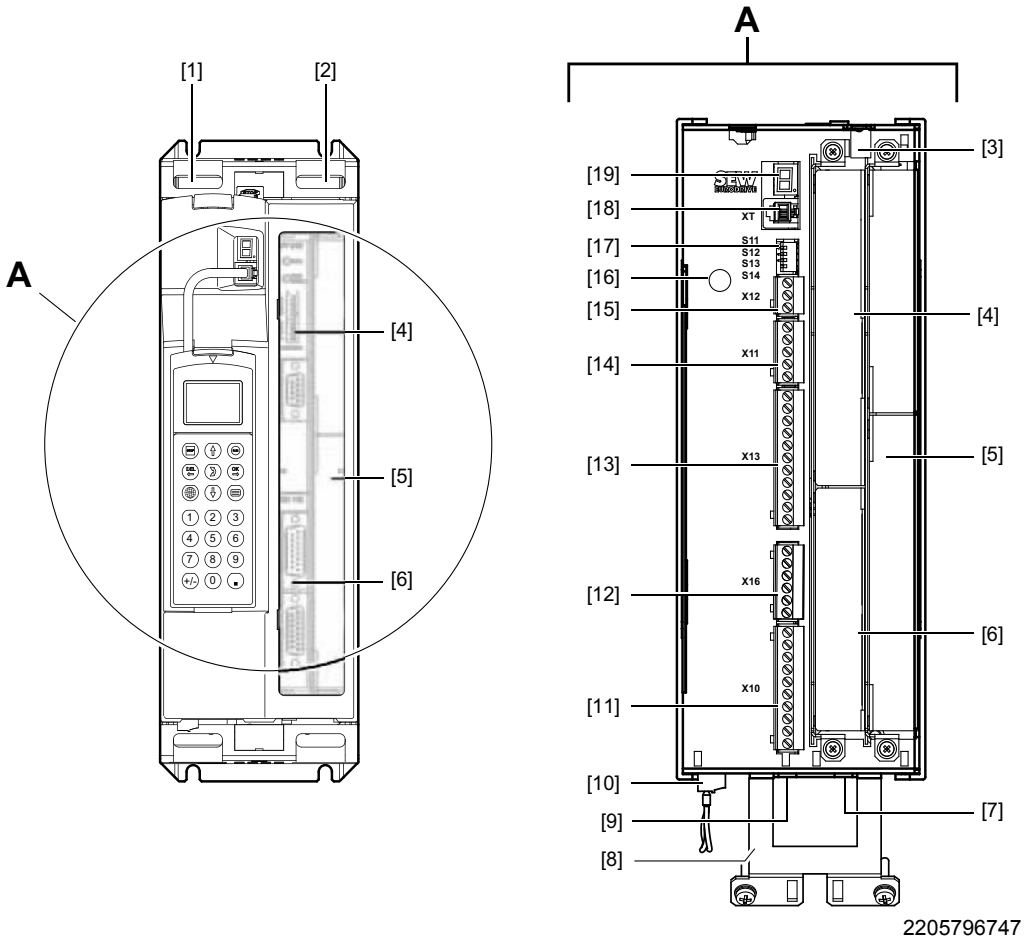
MDX61B-2A3 (AC 230 V units): 0015 / 0022 / 0037



[1] X1: Power supply connection 1/L1, 2/L2, 3/L3, separable
[2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$, separable
[3] Fieldbus slot
[4] Expansion slot
[5] Encoder slot
[6] X3: Braking resistor connection 8/+R, 9/–R and PE connection, separable
[7] X2: Motor connection 4/U, 5/V, 6/W and PE connection, separable
[8] Shield clamp for signal cables and PE connection
[9] X17: Signal terminal strip for safety contacts for safe stop
[10] X10: Signal terminal strip for binary outputs and TF/TH input
[11] X16: Signal terminal strip binary inputs and outputs
[12] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[13] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[14] X12: Signal terminal strip system bus (SBus)
[15] Grounding screw M4 × 14
[16] DIP switches S11 ... S14
[17] XT: Slot for DBG60B keypad or UWS21B serial interface
[18] 7-segment display
[19] Memory card

3.5 Size 2S

MDX61B-5A3 (AC 400/500 V units): 0055 / 0075

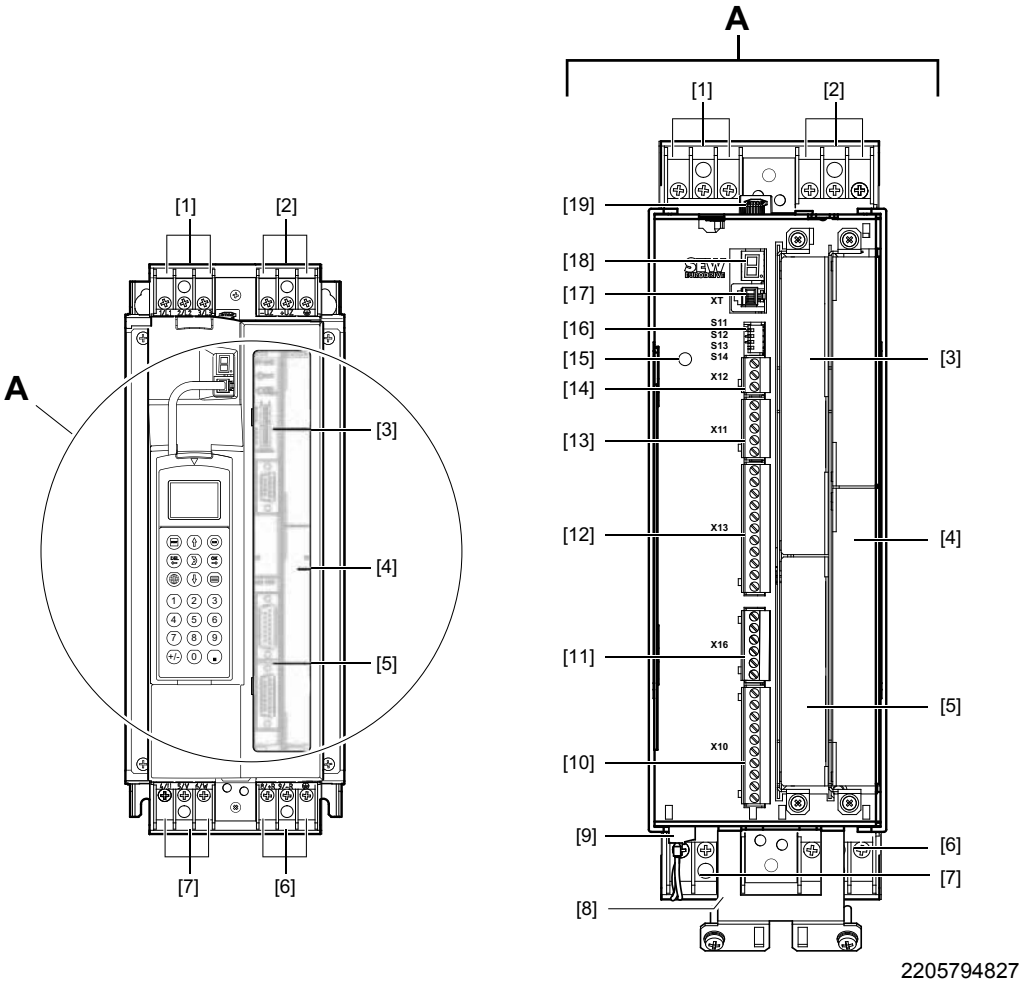


[1] X1: Power supply connection 1/L1, 2/L2, 3/L3
[2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection
[3] Memory card
[4] Fieldbus slot
[5] Expansion slot
[6] Encoder slot
[7] X3: Braking resistor connection 8/+R, 9/–R and PE connection
[8] Shield clamp for signal cables and PE connection
[9] X2: Motor connection 4/U, 5/V, 6/W
[10] X17: Signal terminal strip for safety contacts for safe stop
[11] X10: Signal terminal strip for binary outputs and TF/TH input
[12] X16: Signal terminal strip binary inputs and outputs
[13] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[14] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[15] X12: Signal terminal strip system bus (SBus)
[16] Grounding screw M4 × 14
[17] DIP switches S11 ... S14
[18] XT: Slot for DBG60B keypad or UWS21B serial interface
[19] 7-segment display

3.6 Size 2

MDX61B-5A3 (AC 400/500 V units): 0110

MDX61B-2A3 (AC 230 V units): 0055 / 0075

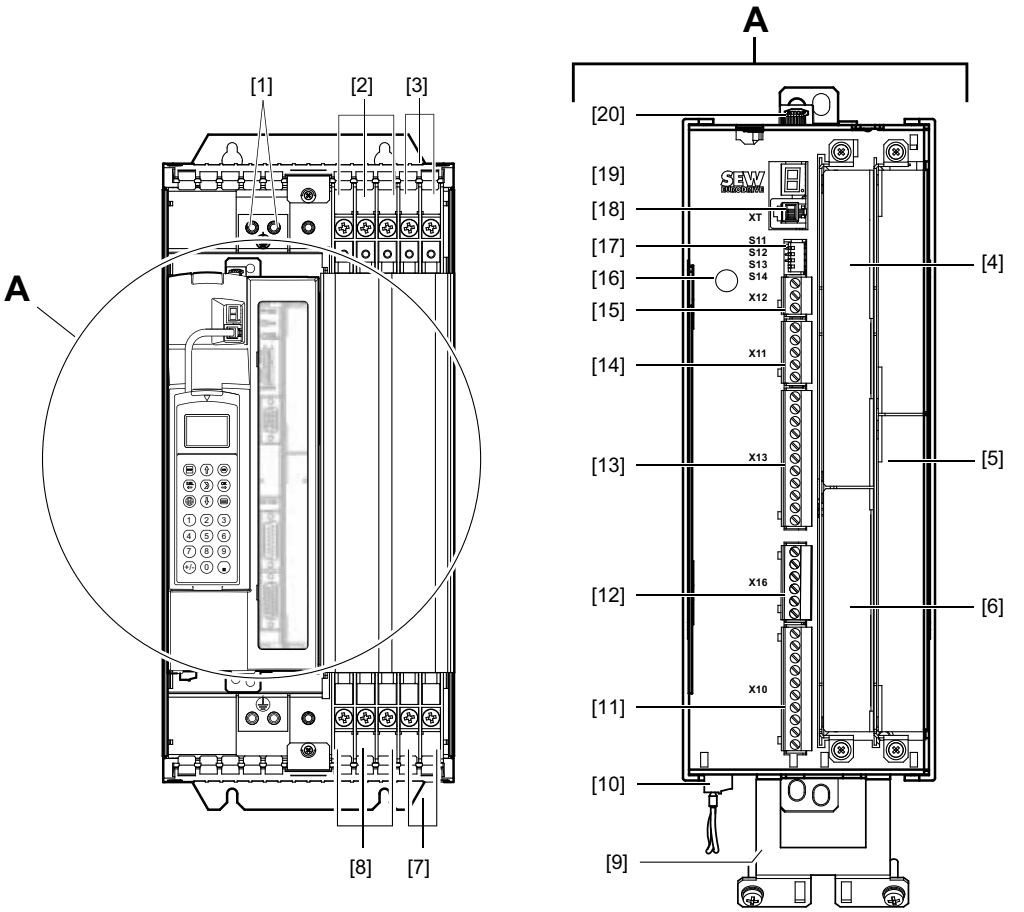


[1] X1: Power supply connection 1/L1, 2/L2, 3/L3
[2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection
[3] Fieldbus slot
[4] Expansion slot
[5] Encoder slot
[6] X3: Braking resistor connection 8/+R, 9/–R and PE connection
[7] X2: Motor connection 4/U, 5/V, 6/W
[8] Shield clamp for signal cables and PE connection
[9] X17: Signal terminal strip for safety contacts for safe stop
[10] X10: Signal terminal strip for binary outputs and TF/TH input
[11] X16: Signal terminal strip binary inputs and outputs
[12] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[13] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[14] X12: Signal terminal strip system bus (SBus)
[15] Grounding screw M4 × 14
[16] DIP switches S11 ... S14
[17] XT: Slot for DBG60B keypad or UWS21B serial interface
[18] 7-segment display
[19] Memory card

3.7 Size 3

MDX61B-503 (AC 400/500 V units): 0150 / 0220 / 0300

MDX61B-203 (AC 230 V units): 0110 / 0150

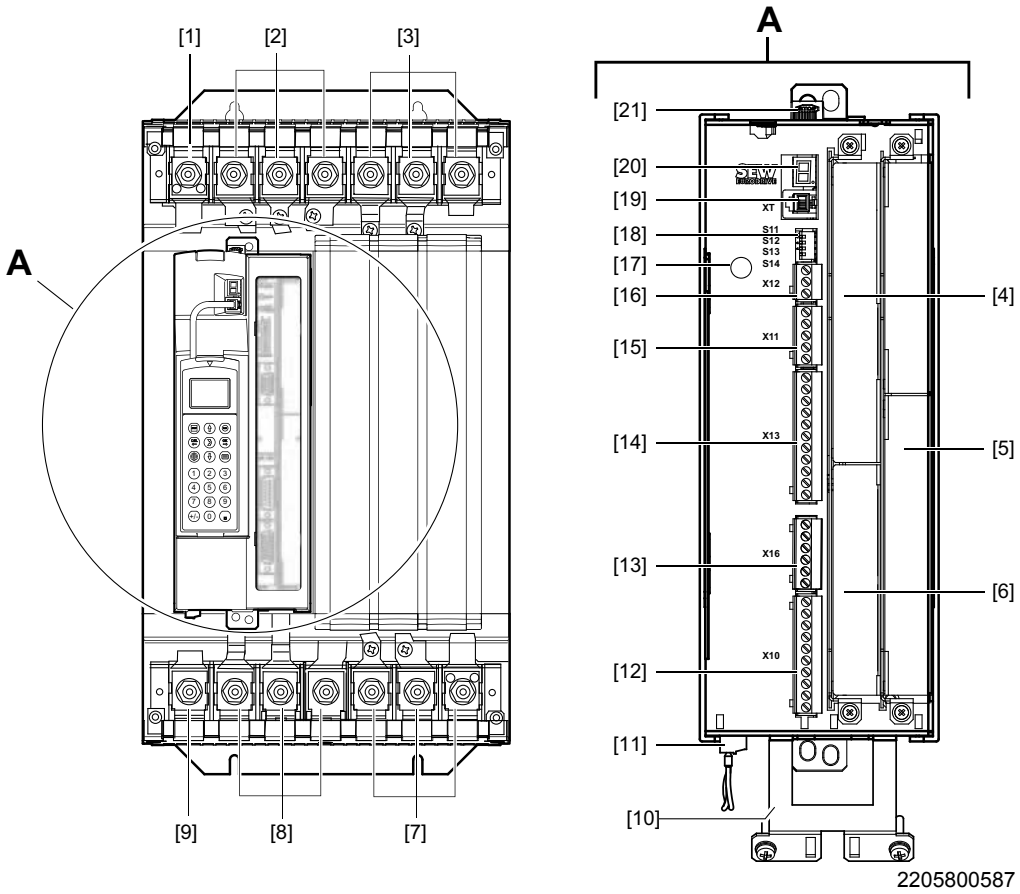


[1] PE connection
[2] X1: Power supply connection 1/L1, 2/L2, 3/L3
[3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$
[4] Fieldbus slot
[5] Expansion slot
[6] Encoder slot
[7] X3: Braking resistor connection 8/+R, 9/–R
[8] X2: Motor connection 4/U, 5/V, 6/W
[9] Shield clamp for signal cables and PE connection
[10] X17: Signal terminal strip for safety contacts for safe stop
[11] X10: Signal terminal strip for binary outputs and TF/TH input
[12] X16: Signal terminal strip binary inputs and outputs
[13] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[14] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[15] X12: Signal terminal strip system bus (SBus)
[16] Grounding screw M4 × 14
[17] DIP switches S11 ... S14
[18] XT: Slot for DBG60B keypad or UWS21B serial interface
[19] 7-segment display
[20] Memory card

3.8 Size 4

MDX61B-503 (AC 400/500 V units): 0370 / 0450

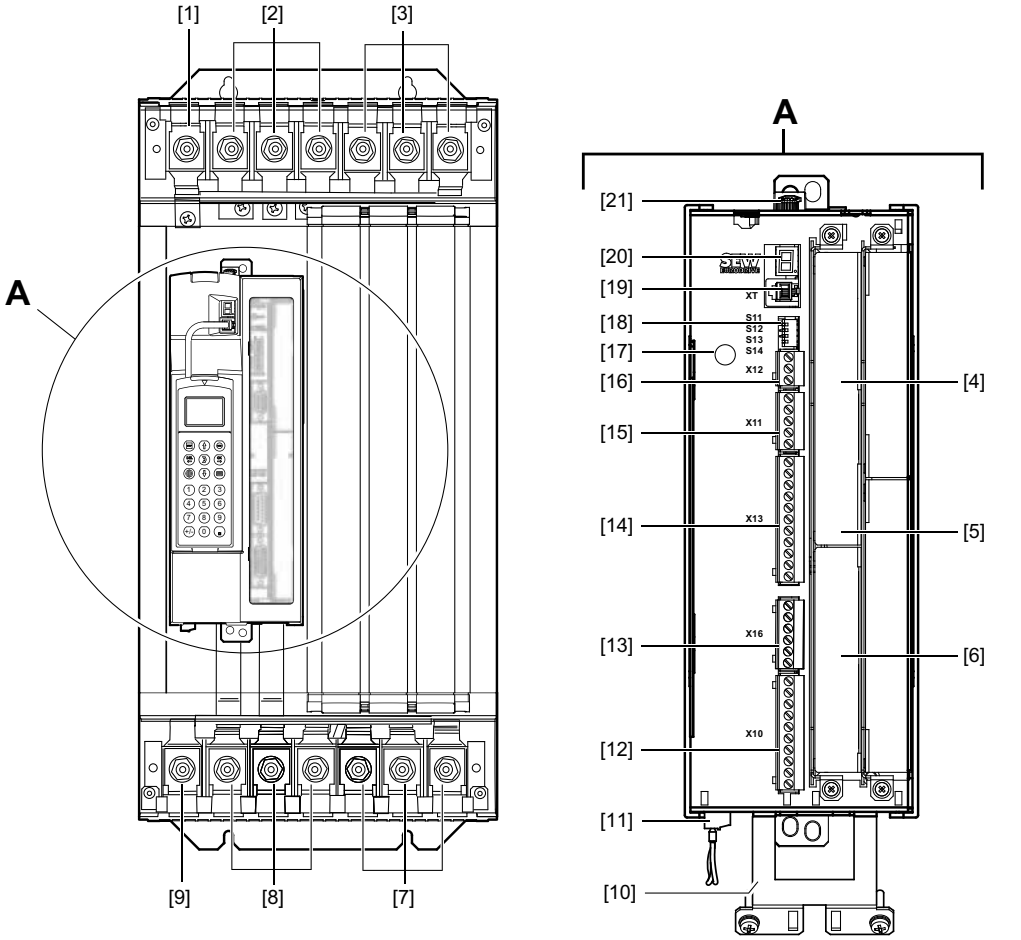
MDX61B-203 (AC 230 V units): 0220 / 0300



[1] PE connection
[2] X1: Power supply connection 1/L1, 2/L2, 3/L3
[3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection
[4] Fieldbus slot
[5] Expansion slot
[6] Encoder slot
[7] X3: Braking resistor connection 8/+R, 9/–R and PE connection
[8] X2: Motor connection 4/U, 5/V, 6/W
[9] PE connection
[10] Shield clamp for signal cables
[11] X17: Signal terminal strip for safety contacts for safe stop
[12] X10: Signal terminal strip for binary outputs and TF/TH input
[13] X16: Signal terminal strip binary inputs and outputs
[14] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[15] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[16] X12: Signal terminal strip system bus (SBus)
[17] Grounding screw M4 × 14
[18] DIP switches S11 ... S14
[19] XT: Slot for DBG60B keypad or UWS21B serial interface
[20] 7-segment display
[21] Memory card

3.9 Size 5

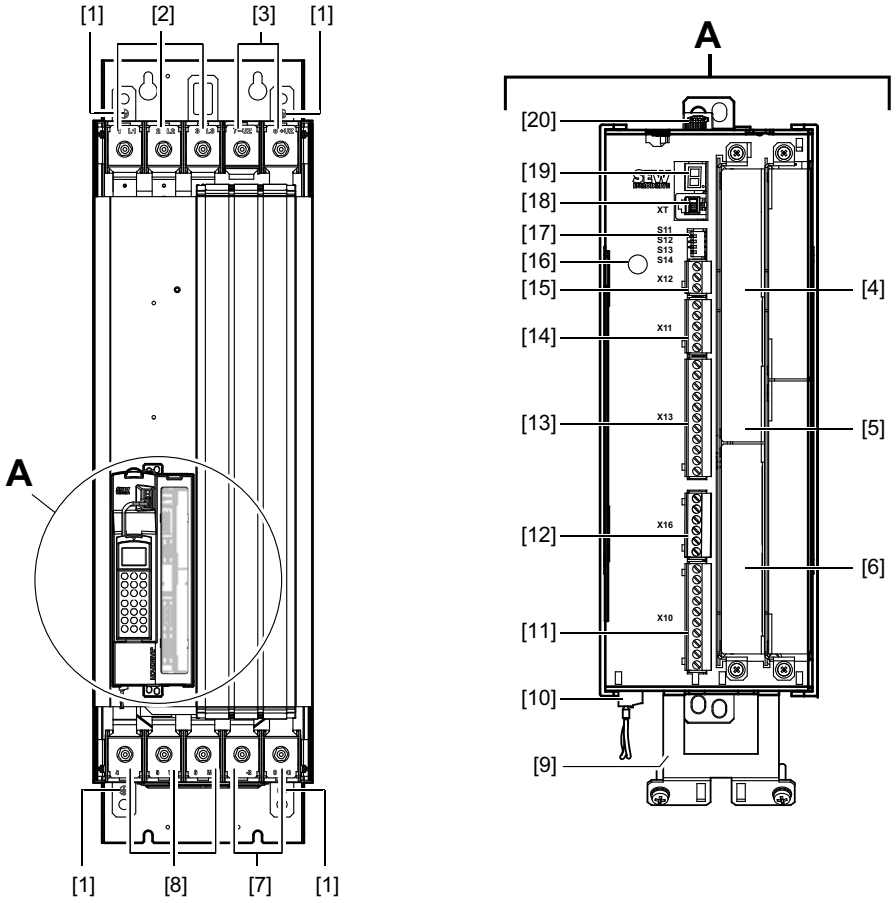
MDX61B-503 (AC 400/500 V units): 0550 / 0750



[1] PE connection
[2] X1: Power supply connection 1/L1, 2/L2, 3/L3
[3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection
[4] Fieldbus slot
[5] Expansion slot
[6] Encoder slot
[7] X3: Braking resistor connection 8/+R, 9/–R and PE connection
[8] X2: Motor connection 4/U, 5/V, 6/W
[9] PE connection
[10] Shield clamp for signal cables
[11] X17: Signal terminal strip for safety contacts for safe stop
[12] X10: Signal terminal strip for binary outputs and TF/TH input
[13] X16: Signal terminal strip binary inputs and outputs
[14] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[15] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[16] X12: Signal terminal strip system bus (SBus)
[17] Grounding screw M4 × 14
[18] DIP switches S11 ... S14
[19] XT: Slot for DBG60B keypad or UWS21B serial interface
[20] 7-segment display
[21] Memory card

3.10 Size 6

MDX61B-503 (AC 400/500 V units): 0900 / 1100 / 1320



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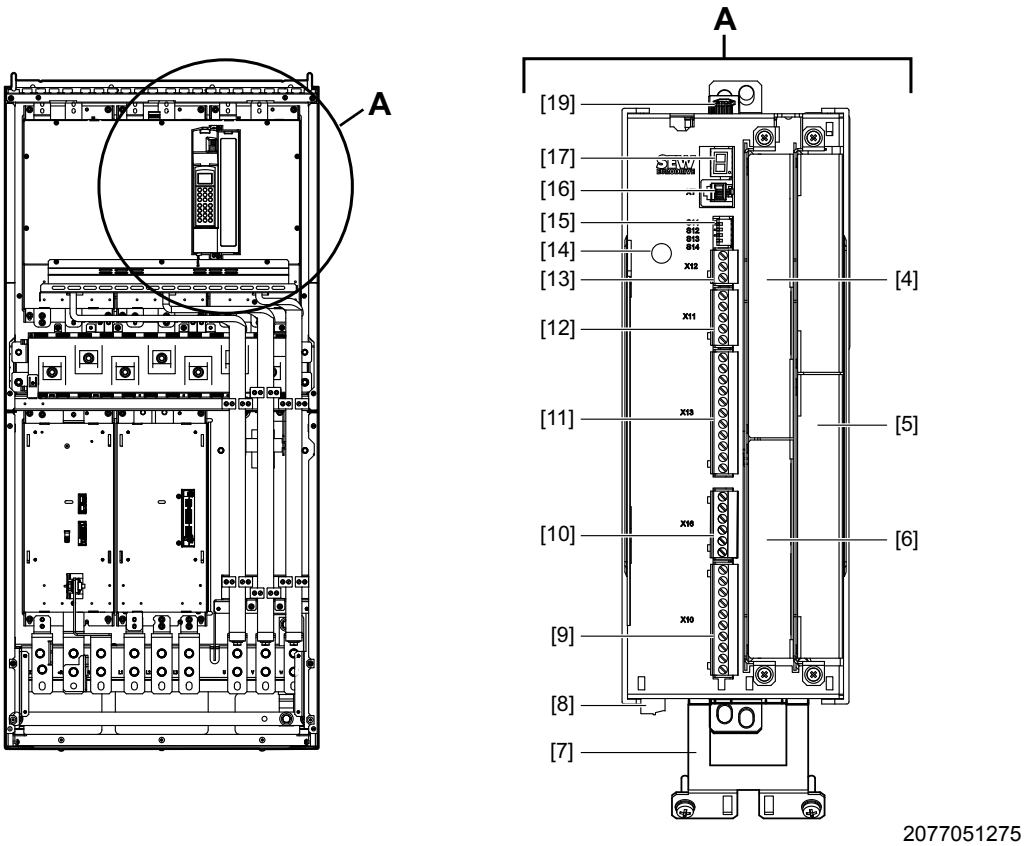
[1] PE connection
[2] X1: Power supply connection 1/L1, 2/L2, 3/L3
[3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$
[4] Fieldbus slot
[5] Expansion slot
[6] Encoder slot
[7] X3: Braking resistor connection 8/+R, 9/–R
[8] X2: Motor connection 4/U, 5/V, 6/W and PE connection
[9] Shield clamp for signal cables
[10] X17: Signal terminal strip for safety contacts for safe stop
[11] X10: Signal terminal strip for binary outputs and TF/TH input
[12] X16: Signal terminal strip binary inputs and outputs
[13] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[14] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[15] X12: Signal terminal strip system bus (SBus)
[16] Threaded hole for grounding screw M4 × 8 or M4 × 10
[17] DIP switches S11 ... S14
[18] XT: Slot for DBG60B keypad or UWS21B serial interface
[19] 7-segment display
[20] Memory card

3.11 Size 7

3.11.1 Control unit

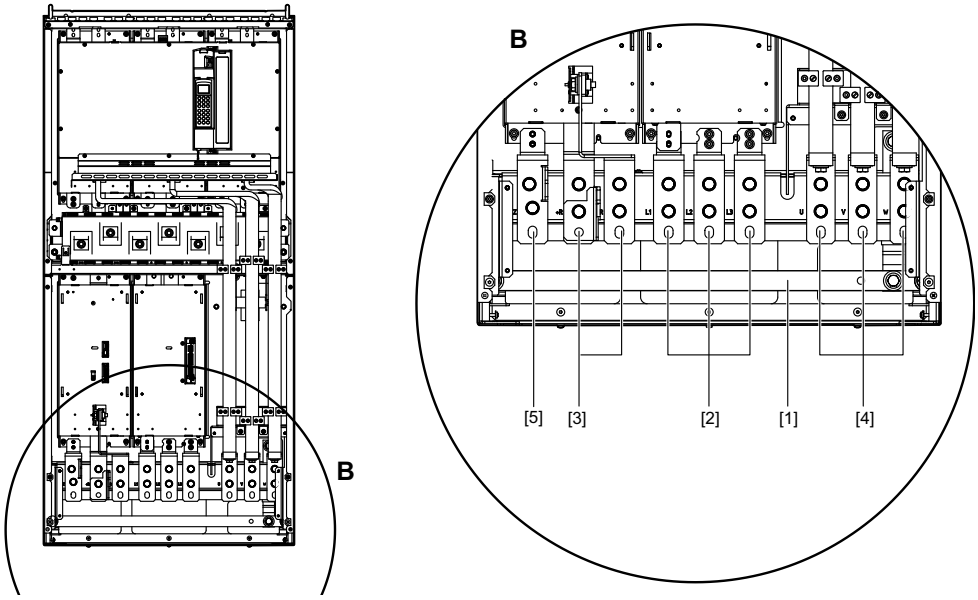
MDX61B-503 (AC 400/500 V units): 1600 / 2000 / 2500



[4] Fieldbus slot
[5] Expansion slot
[6] Encoder slot
[7] Shield clamp for signal cables
[8] X17: Signal terminal strip for safety contacts for safe stop
[9] X10: Signal terminal strip for binary outputs and TF/TH input
[10] X16: Signal terminal strip binary inputs and outputs
[11] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
[12] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[13] X12: Signal terminal strip system bus (SBus)
[14] Grounding screw M4 × 14
[15] DIP switches S11 ... S14
[16] XT: Slot for DBG60B keypad or UWS21B serial interface
[17] 7-segment display
[19] Memory card

3.11.2 Power section

MDX61B-503 (AC 400/500 V units): 1600 / 2000 / 2500



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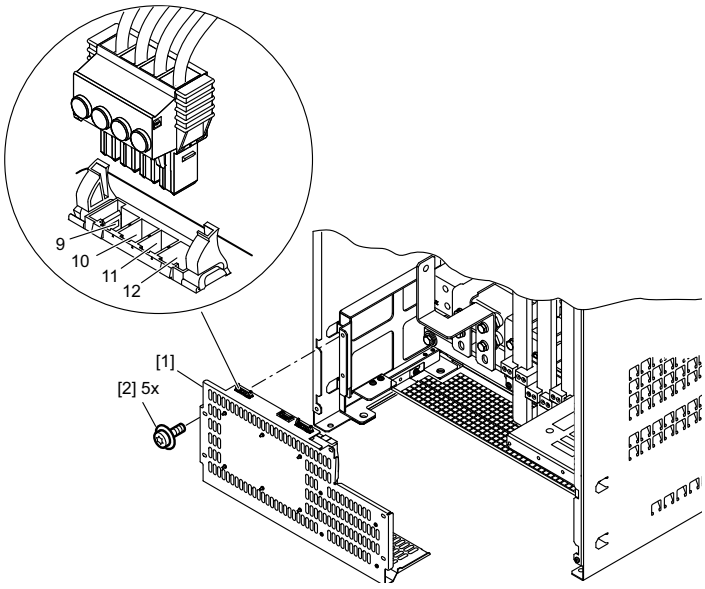
[1] PE connection rail (thickness = 10 mm)
[2] X1: Power supply connection 1/L1, 2/L2, 3/L3
[3] X3: Braking resistor connection 8/+R, 9/–R
[4] X2: Motor connection 4/U, 5/V, 6/W
[5] $-U_Z$: Only with DC link adapter accessory

3.11.3 Power supply unit

MDX61B-503 (AC 400/500 V units): 1600 / 2000 / 2500



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[1] DC power supply unit
[2] Screw

4 Installation

4.1 Installation instructions for the basic unit

4.1.1 Tightening torques

Tightening torques of power terminals

Only use **original connection elements**. Note the **permitted tightening torques** for MOVIDRIVE® power terminals.

Size	Tightening torque	
	Nm	lb in
0, 1 and 2S	0.6	5
2	1.5	13
3	3.5	31
4 and 5	14.0	124
6	20.0	177
7	70.0	620

- The **permitted tightening torque** for the **signal terminals** is 0.6 Nm (5 lb in).

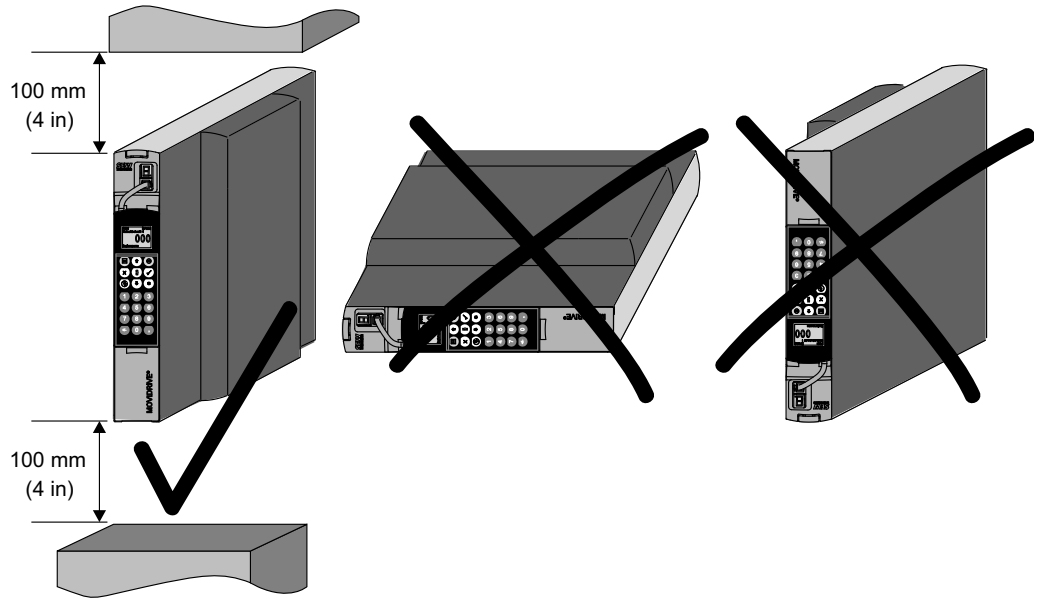
General tightening torques

Note the permitted tightening torques:

Component	Screws	Tightening torque	
		Nm	lb in
Screw cover	M5 x 25	1.4 - 1.7	12 - 15
Screws with integral disk	M4	1.7	15
	M5	3.4	30
	M6	5.7	50
Current rail screws	M10	20	180
Insulating spacer	M10 (SW32)	30	270

4.1.2 Minimum clearance and mounting position

- Leave at least **100 mm (4 in) clearance above and below the unit for optimum cooling**. Make sure air circulation in the clearance is not impaired by cables or other installation equipment. With sizes 4, 5 and 6, do not install any components which are sensitive to high temperatures within 300 mm (12 in) of the top of the unit.
- Ensure unobstructed cooling air supply and make sure that the units are not subjected to heated air from nearby components.
- There is no need for clearance at the sides of the unit. You may line up the units directly next to each other.
- Only install the units **vertically**. Do not install them horizontally, tilted or upside down (→ following figure, applies to all sizes).



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4.1.3 Separate cable ducts

- Route **power cables** and **signal cables** in **separate cable ducts**.

4.1.4 Fuses and earth-leakage circuit breakers

- Install the **input fuses at the beginning of the supply system lead** after the supply bus junction (→ Wiring diagram for basic unit, power section and brake).
- SEW-EURODRIVE recommends that you do not use earth-leakage circuit breakers but take alternative measures. Please refer to the section "PE connection". If you want to use an earth-leakage circuit breaker (RCD) nonetheless, **note the following according to EN 61800-5-1**:

⚠ WARNING

MOVIDRIVE® can cause a DC current in the PE conductor, which might result in a malfunction of the earth leakage circuit breaker.

The use of an incorrect earth-leakage circuit breaker type can cause death or severe injuries.

- Either take alternative measures instead of earth-leakage circuit breakers according to the relevant standards (e.g. 61800-5-1, EN 60204-1) – see section "PE connection" –
- or use earth-leakage circuit breakers of type B.

4.1.5 Line and brake contactors

- Only use **contactors in utilization category AC-3** (IEC 60947-4-1) as mains and brake contactors.

INFORMATION

- Only use the **input contactor K11** (→ Sec. "Wiring diagram for basic unit") to **switch the inverter on and off**. Do not use it for jog mode. For jog mode, use the the commands "Enable/stop", "CW/stop" or "CCW/stop".
- Observe a minimum switch-off time of 10 s for the supply system contactor K11.

4.1.6 PE connection (→EN 61800-5-1)

Earth-leakage currents ≥ 3.5 mA may occur during normal operation. To meet the requirements of EN 61800-5-1 observe the following:

- **Supply system lead < 10 mm²**:

  Route a **second PE conductor with the cross section of the power supply line** in parallel to the protective earth via separate terminals or use a **copper protective earth conductor with a cross section of 10 mm² (AWG 7)**.

- **Supply system cable 10 mm² ... 16 mm²**:

  Route a **copper protective earth conductor with the cross section of the supply system lead**.

- **Supply system cable 16 mm² ... 35 mm²**:

  Route a **copper protective earth conductor with a cable cross section of 16 mm²**.

- **Supply system cable < 35 mm²**:

  Route a **copper protective earth conductor with the cross section of the supply system lead**.

4.1.7 IT systems

- MOVIDRIVE® B is designed for operation on TN and TT systems with a directly grounded star point. Operation on voltage supply systems with a non-grounded star point is permitted In this case, SEW-EURODRIVE recommends using **earth-leakage monitors with pulse-code measurement** for voltage supply systems with a non-grounded star point **(IT systems)**. Using such devices prevents the earth-leakage monitor mis-tripping due to the ground capacitance of the inverter. **No EMC limits are specified for interference emission** in **voltage supply systems without grounded star point** (IT systems).
- Size 7 can be converted for IT networks. Note the information in the "MOVIDRIVE® MDX60B / 61B – Inspection and Maintenance of Size 7" manual.

4.1.8 Cable cross sections

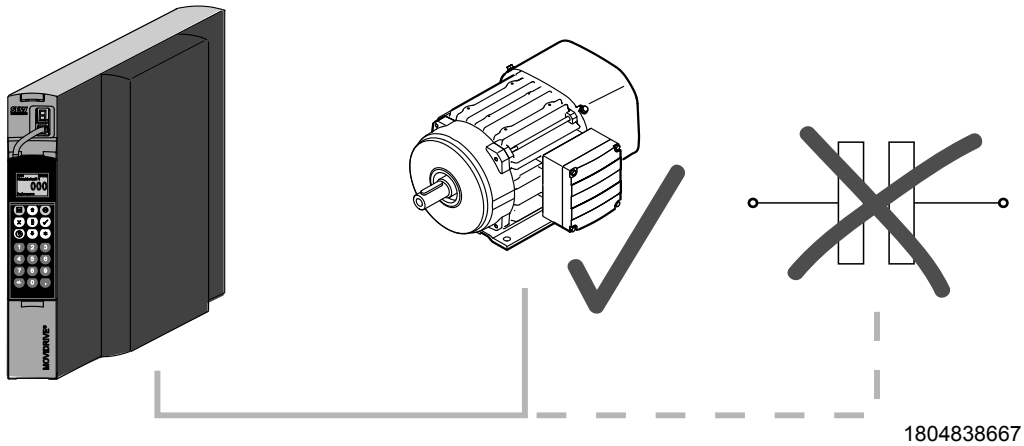
- Supply system cable: **Cable cross section according to rated input current** I_{mains} at rated load.
- Motor cable: **Cable cross section according to rated output current** I_{rated}.
- Signal cables of basic unit (terminals X10, X11, X12, X13, X16):
  - One core per terminal 0.20 ... 2,5 mm^2 (AWG 24 to 13)
  - Two cores per terminal 0.25 ... 1 mm^2 (AWG 23 to 17)
- Signal cables of terminal X17 and DIO11B terminal expansion board (terminals X20, X21, X22):
  - One core per terminal 0,08 ... 1,5 mm^2 (AWG 28 to 16)
  - Two cores per terminal 0.25 ... 1 mm^2 (AWG 23 to 17)

4.1.9 Unit output

NOTICE

MOVIDRIVE® B can suffer irreparable damage if you connect capacitive loads.

- **Only connect ohmic/inductive loads (motors).**
- Never connect capacitive loads.



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4.1.10 Installing braking resistors BW.../ BW..-T / BW...-P

- Mounting permitted:
  - on horizontal surfaces
  - on vertical surfaces with brackets at the bottom and perforated sheets at top and bottom
- Mounting not permitted:
  - on vertical surfaces with brackets at the top, right or left

4.1.11 Connection of braking resistors

- Use **two tightly twisted leads or a 2-core shielded power cable**. Cable cross section according to trip current I_F of F16. The rated voltage of the cable must amount to at least V_0/V = 300 V / 500 V (in accordance with DIN VDE 0298).
- Protect the braking resistor (except for BW90-P52B) using a **bimetallic relay** (→ wiring diagram for basic unit, power section and brake). Set the **trip current** according to the **technical data of the braking resistor**. SEW-EURODRIVE recommends using an overcurrent relay from trip class 10 or 10A in accordance with EN 60947-4-1.
- For braking resistors of the **BW...-T / BW...-P** series, the **integrated temperature switch/overcurrent relay can be connected using a 2-core shielded cable** as an **alternative** to a bimetallic relay.
- **Flat-type braking resistors** have internal thermal overload protection (fuse which cannot be replaced). Install the **flat-type braking resistors** together with the appropriate **touch guard**.

4.1.12 Operating braking resistors

- The connection leads to the braking resistors carry a **high pulsed DC voltage** during rated operation.

⚠ WARNING

The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_{rated}.

Risk of burns and fire.

- Choose a suitable installation location. Braking resistors are usually mounted on top of the control cabinet.
- Do not touch the braking resistors.

4.1.13 Binary inputs / binary outputs

- The **binary inputs** are electrically **isolated** by optocouplers.
- The **binary outputs** are **short-circuit proof** and **protected against external voltage to DC 30 V.** External voltages > DC 30 V can cause irreparable damage to binary outputs.

4.1.14 EMC-compliant installation

- All cables except for the supply system lead must be **shielded**. As an alternative to the shielding, the option HD.. (output choke) can be used for the motor cable to achieve the emitted interference limit values. .

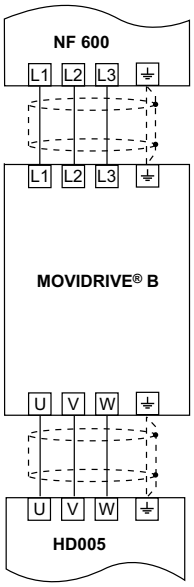

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Fig. 1: Shielded cables

- When using shielded motor cables, e.g. prefabricated motor cables from SEW-EURODRIVE, you must keep the **unshielded conductors between the shield and connection terminal of the inverter as short as possible**.
- Apply the **shield by the shortest possible route and make sure it is grounded over a wide area at both ends**. Ground one end of the shield using an interference suppression capacitor (220 nF/50 V) to avoid ground loops. If using double-shielded cables, ground the outer shield on the inverter end and the inner shield at the other end.

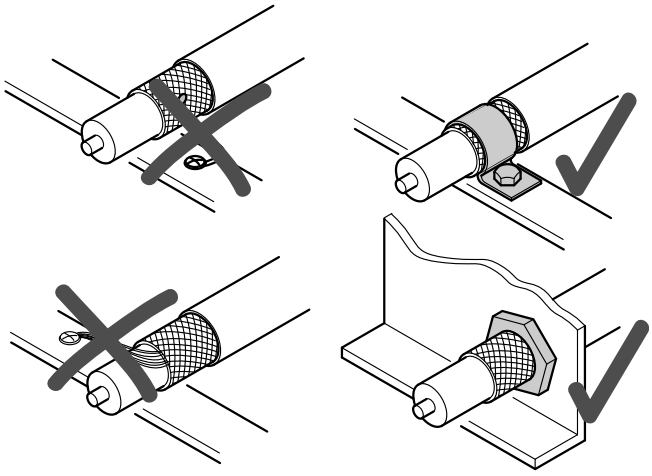

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Fig. 1: Correct shield connection using metal clamp (shield clamp) or cable gland

- You can also use **earthed sheet-metal ducts or metal pipes** to **shield the cables**. **Route** the **power and signal cables separately**.
- Ground the **inverter** and **all additional units to ensure high-frequency compatibility** (wide area, metal-on-metal contact between the unit housing and ground, e.g. unpainted control cabinet mounting panel).

INFORMATION

- MOVIDRIVE® B is a product with restricted availability in accordance with EN 61800-3. It may cause EMC interference. In this case, it may be recommended for the operator to carry out suitable measures.
- For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

NF.. line filter

- The NF.. line filter option can be used to maintain the class C1 limit for MOVIDRIVE® MDX60B/61B units size 0 to 5.
- Do not switch between the line filter and MOVIDRIVE® MDX60B/61B.
- Install the **line filter close to the inverter** but outside the minimum clearance for cooling.
- Keep the **length of the cable between the line filter and inverter to an absolute minimum**, and never more than 400 mm. Unshielded, twisted cables are sufficient. Use also unshielded lines for the supply system cable.
- SEW-EURODRIVE recommends taking one of the following **EMC measures on the motor side to maintain class C1 and C2 limits**:
  - Shielded motor cable
  - HD... output choke option
  - HF.. output filter option (in operating modes VFC and V/f)

Interference emission category

Compliance with category C2 according to EN 61800-3 has been tested in a CE typical drive system. SEW-EURODRIVE can provide detailed information on request.

⚠ WARNING

This product can cause high-frequency interferences in residential areas which can require measures for interference suppression.

HD... output choke

- Install the **output choke close to the inverter** but outside the minimum clearance for cooling.
- For HD001 ... HD003: Route **all three phases (U, V, W) of the motor cable [1] through the output choke**. To achieve a higher filter effect, **do not route the PE conductor through the output choke**.

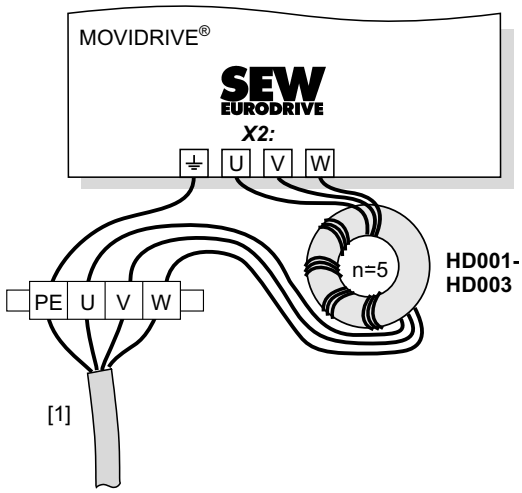

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Fig. 2: Connection of output choke HD001 – HD003

[1] Motor cable

4.1.15 Installation notes for size 6

The MOVIDRIVE® units of size 6 (0900 ... 1320) are equipped with a factory mounted lifting lug [1]. Use a crane and the lifting eye [1] to install the unit.

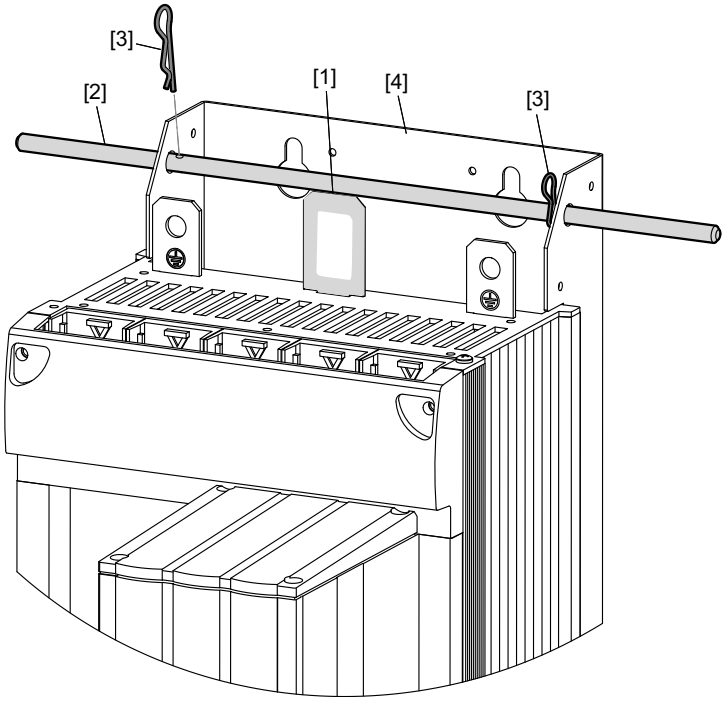
⚠ DANGER

Suspended load.

Danger of fatal injury if the load falls.

- Do not stand under the suspended load.
- Secure the danger zone.

If a crane is not available, you can push a carrying bar [2] through the rear panel [4] to facilitate installation (included in the delivery scope of size 6). Secure the carrying bar [2] against axial displacement using the split pins [3] (see figure below).



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[1] Fixed lifting eye
[2] Carrying bar (included in the delivery of size 6)
[3] 2 split pins (included in the delivery of size 6)
[4] Rear panel

4.1.16 Installation notes for size 7

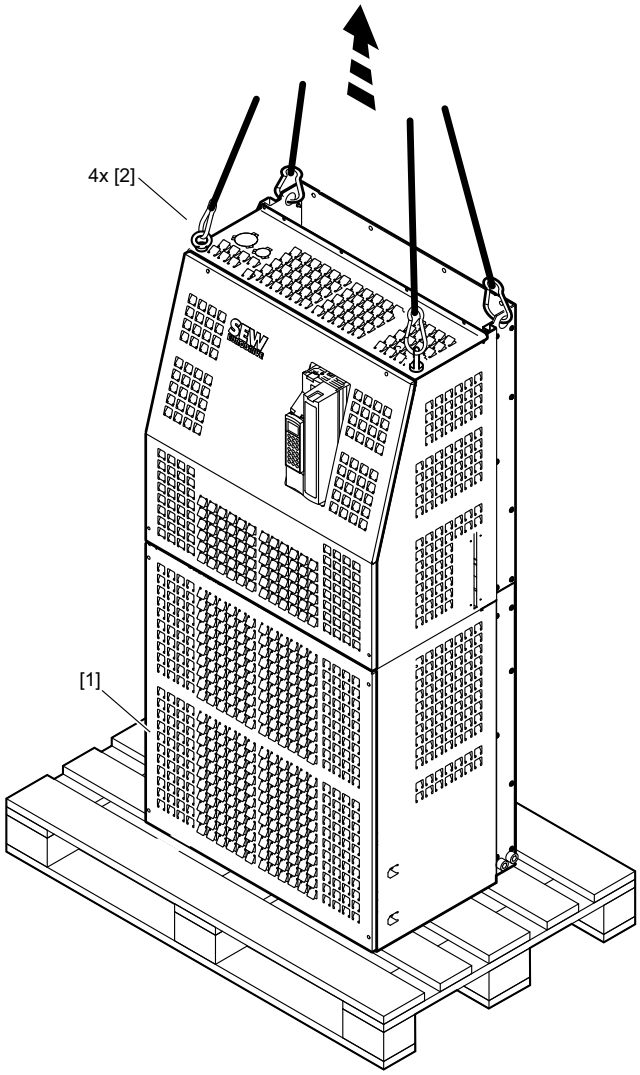
MOVIDRIVE® units size 7 (1600 - 2500) have 4 fixed lifting eyes [2] for transport. You may only use these four lifting eyes [2] for installation.

⚠ DANGER

Suspended load.

Danger of fatal injury if the load falls.

- Do not stand under the suspended load.
- Secure the danger zone.
- Always use all 4 lifting eyes.
- Align the lifting eyes with the direction of tension



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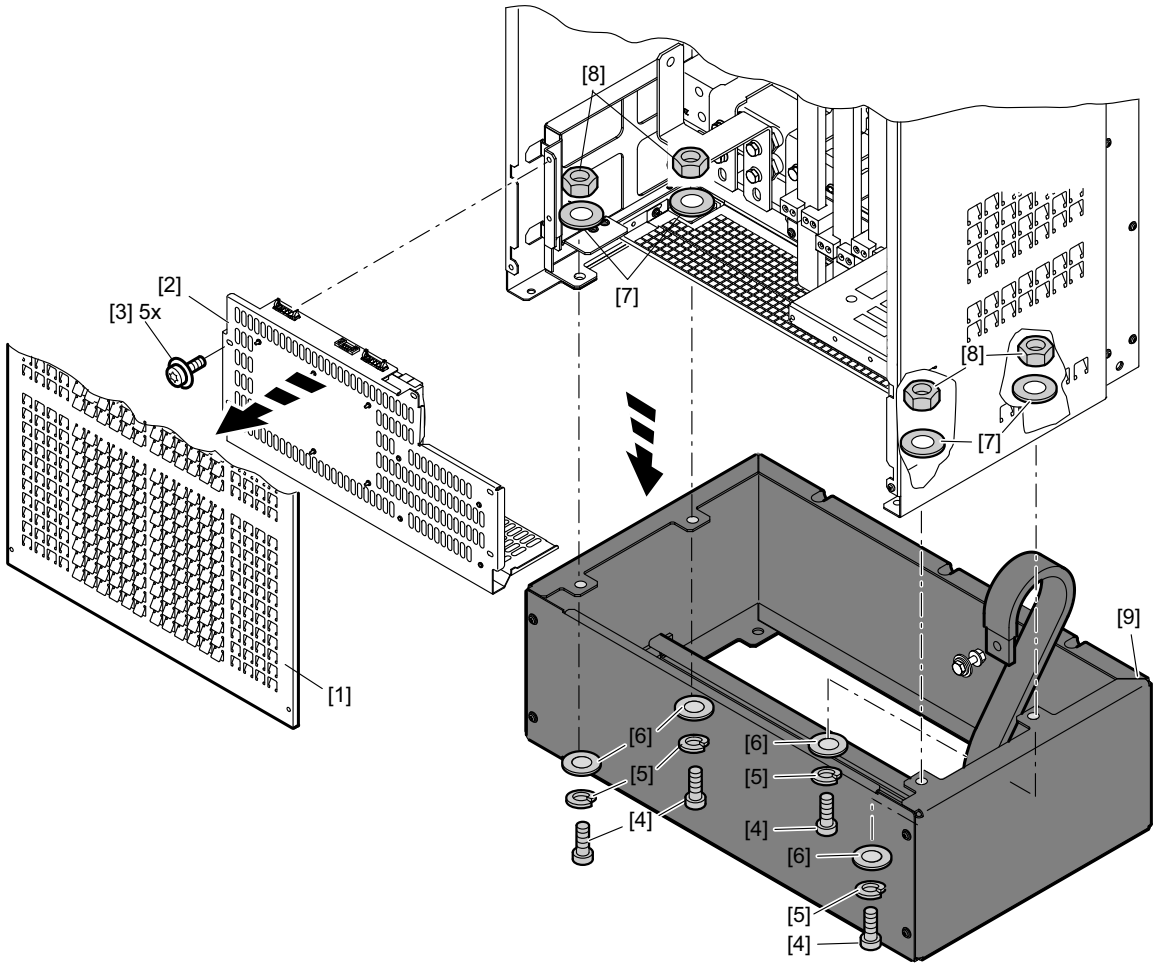
[1] Installed front cover
[2] 4 lifting eyes

4.1.17 Optional scope of delivery for size 7

Mounting base

The **mounting base DLS11B** with mounting material [9] (part no.: 1 822 602 7) is used to **install MOVIDRIVE® B, size 7 on the floor of the control cabinet**. MOVIDRIVE® B size 7 must be screwed onto the mounting base immediately after installation (see following figure). Do not take MOVIDRIVE® B size 7 into operation until the mounting base has been completely mounted.



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The mounting material (pos. 3 - 8) is enclosed in a plastic bag.

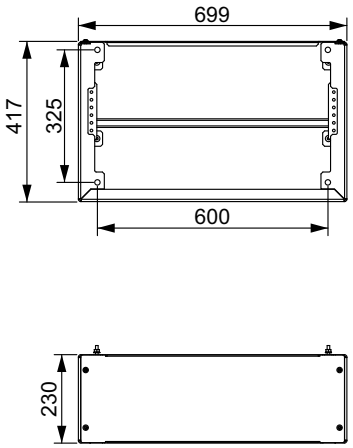
[1] Front cover
[2] Insert (for external power supply)
[3] Retaining screws for insert
[4] Machine screw M8 × 30 hexagon socket
[5] Lock washer
[6] Washer
[7] Washer
[8] M8 nut

Do the following to install the mounting base [9] to MOVIDRIVE® B size 7:

1. Loosen (not unscrew!) the 4 retaining screws of the front cover [1] until you can lift it off. Remove the front cover [1].
2. Remove the insert [2]. Loosen the 5 retaining screws [5] to do so.
3. The following steps apply to each of the 4 mounting holes.
   - Position the washer [7] centrically between inverter and mounting base [9].
   - Place the lock washer [5] and the washer [6] onto the socket head screw [4] M8×30.
   - Insert the preassembled socket head screw through the mounting hole.
   - Screw the M8 nut [8] onto the socket head screw. Tightening torque 20 Nm. Apply thread locking compound.
4. Replace the insert [2] into the unit and fasten it using the 5 retaining screws.
5. Replace the front cover [1] onto the unit and fasten it using the 4 retaining screws.

Dimension drawing of mounting base

The following figure shows the dimensions of the mounting base.



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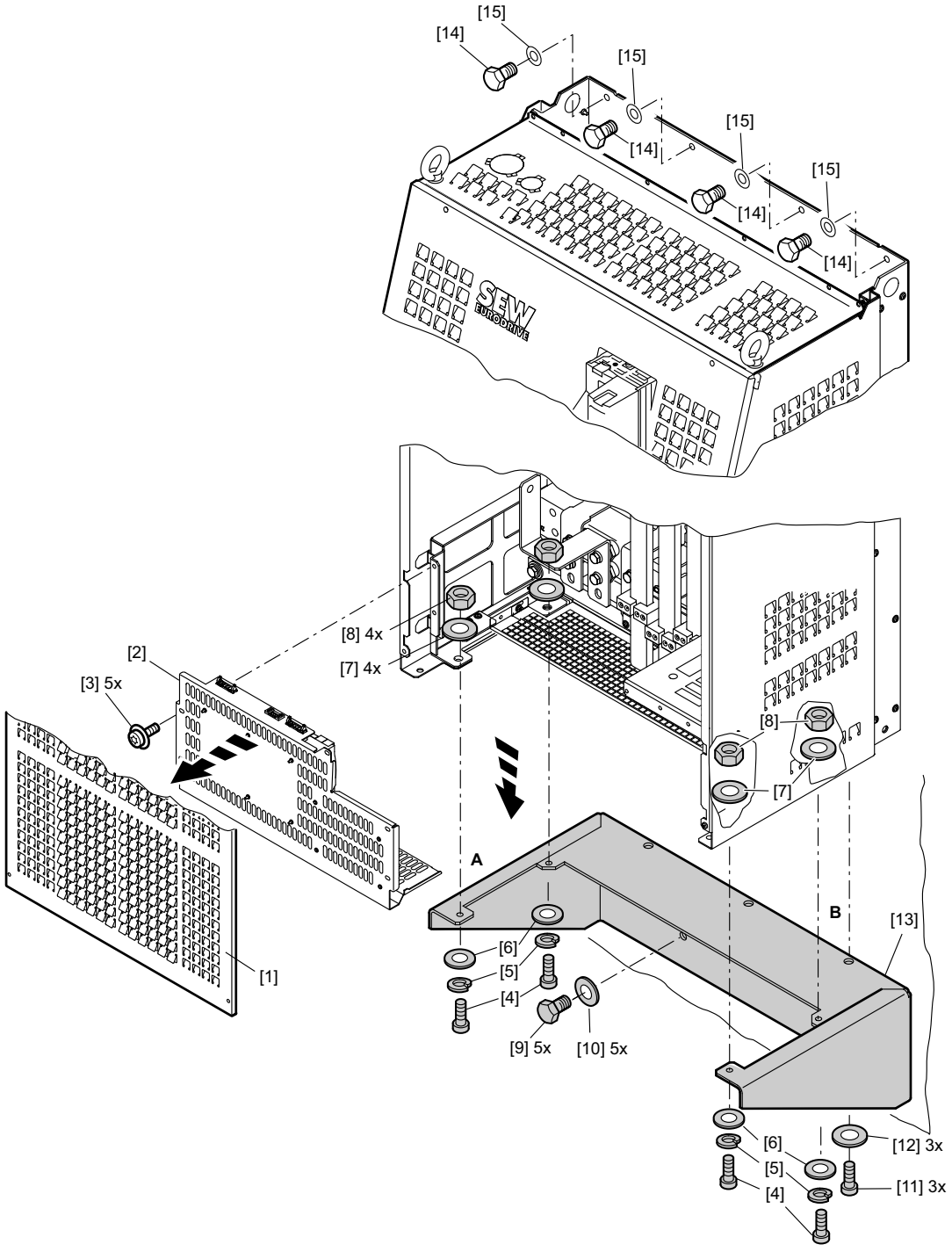
Wall bracket

The **wall bracket DLH11B** [13] (part no: 1 822 610 8) is used to **attach MOVIDRIVE® B size 7 to the wall** (see following figure). Do not take MOVIDRIVE® B size 7 into operation until the installation of the unit is complete.



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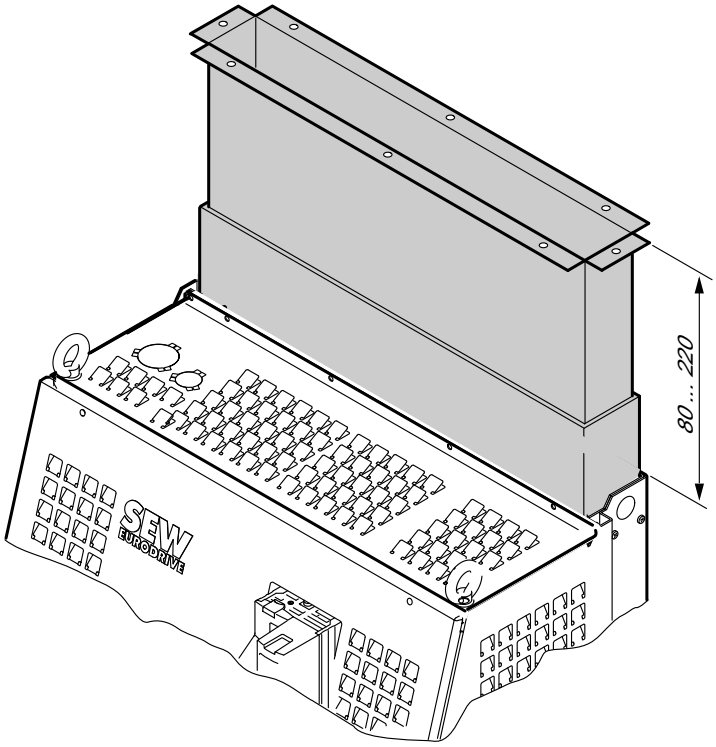
The installation material for wall mounting is not included in the scope of delivery of SEW-EURODRIVE.

Proceed as follows to fasten the wall bracket [13] to MOVIDRIVE® B size 7:

1. Loosen (not unscrew!) the 4 retaining screws of the front cover [1] until you can lift it off. Remove the front cover [1].
2. Remove the insert [2]. Loosen the 5 retaining screws [5] to do so.
3. The wall bracket [13] is screwed onto MOVIDRIVE® B at 5 points [A, B] (see above figure).
   - Position the a washer [7] at each point centrically between inverter and wall bracket [13].
   - Place the lock washer [5] and the washer [6] onto the socket head screw [4] M8×30.
   - Insert the preassembled socket head screw through the two mounting holes [A].
   - Screw the M8 nut [8] onto the socket head screw. Tightening torque 20 Nm. Apply thread locking compound.
   - Screw the wall bracket to MOVIDRIVE® B at the 3 mounting bores [B] using the retaining screws [11] and washers [12].
4. Replace the insert [2] into the unit and fasten it using the 5 retaining screws.
5. Replace the front cover [1] onto the unit and fasten it using the 4 retaining screws.
6. To mount MOVIDRIVE® B size 7 to a wall (material not included in the scope of delivery), use
   - 4 retaining screws [14] and washers [15] for the 4 mounting holes at the top of the unit and
   - 5 retaining screws [9] and washers [10] for the 5 mounting holes on the wall bracket [13].

Heat dissipation through air duct

A **DLK11B air duct** (part no.: 1 822 603 5) is available as an option to dissipate heat of MOVIDRIVE® B size 7. Install the air duct in such a way that it points vertically upwards (see below figure).



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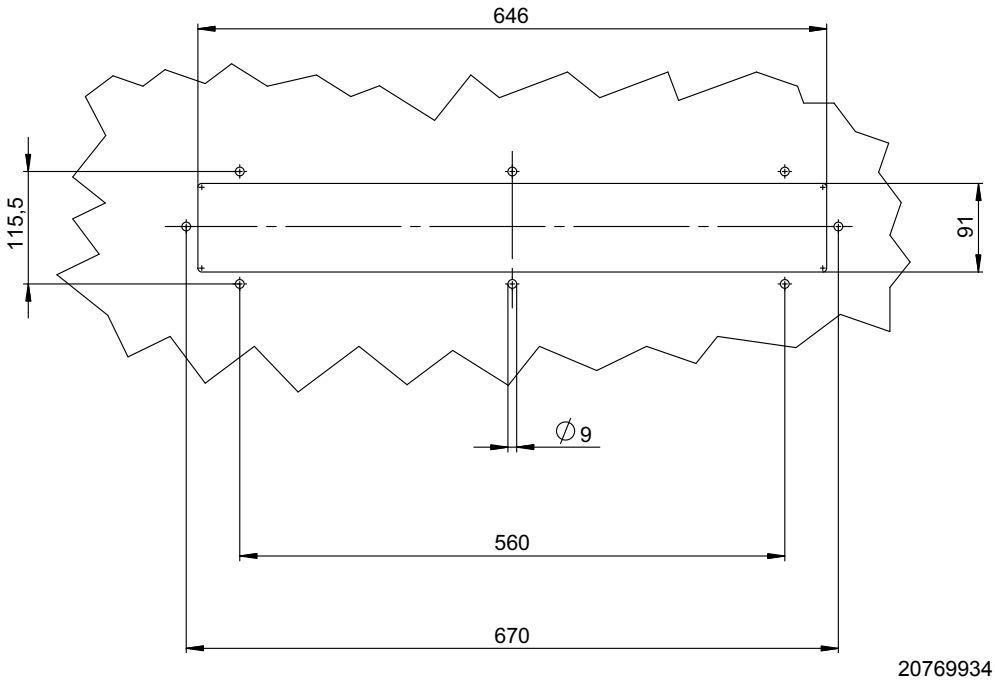
Hole pattern of the air duct



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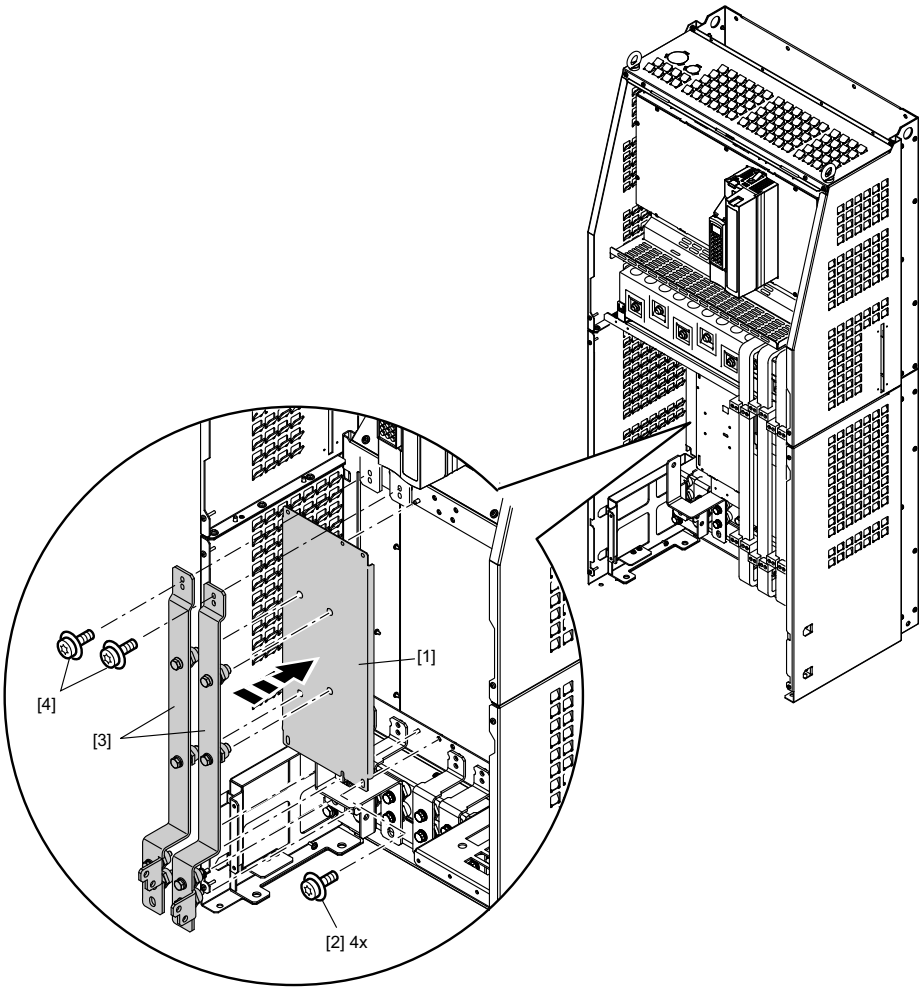
DC link adapter 2Q

The **DC link adapter 2Q DLZ12B** (part no.: 1 822 729 5) can be used to provide a DC link connection at the bottom of the unit:



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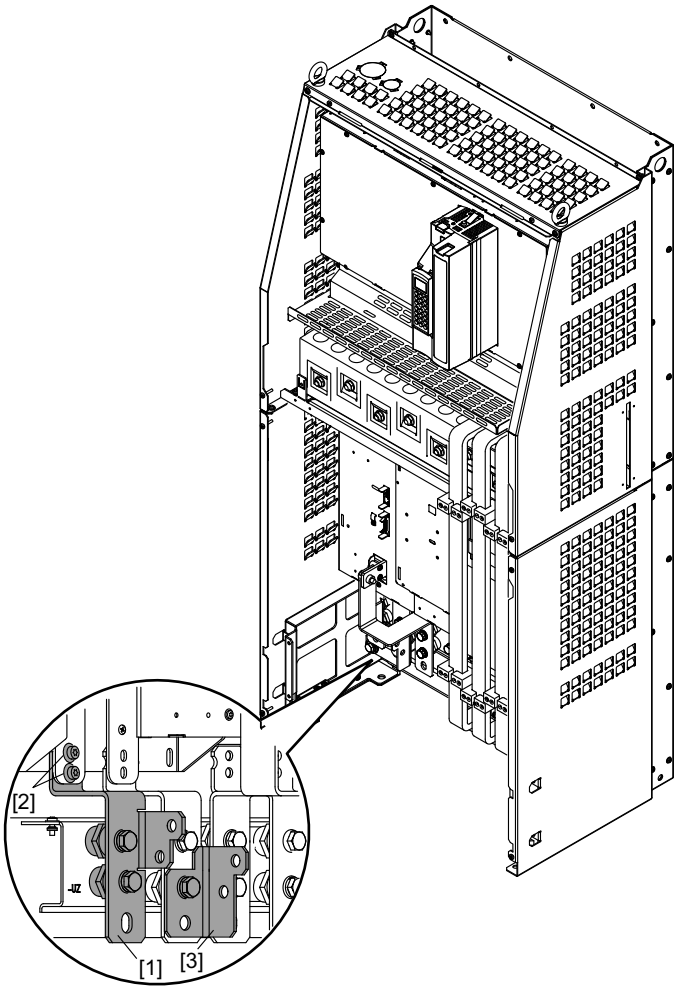
1. Loosen the 4 screws of both the upper and lower cover and remove them.
2. Loosen the 5 screws of the insert and remove it.
3. Place the cover panel on the fastening pin of the slot for the brake chopper module.
4. Position the 2 upper retaining screws [2] of the cover panel [1] in the frame. Position the 2 lower retaining screws of the cover panel in the frame.
5. Screw the insulating spacers tightly to the cover panel [1].
6. Screw the insulating spacers tightly to the frame (bottom).
7. Position the 2 screws of the fixing strap $-U_Z$ at the DC link (top left).
8. Position the 2 screws of the fixing strap $+U_Z$ at the DC link (top right).
9. Position the 4 screws of the fixing straps $-U_Z$ and $+U_Z$ on the insulating spacer.
10. Tighten all screws of the fixing straps $-U_Z$ and $+U_Z$.
11. Replace the covers.

DC link adapter 4Q

The **DC link adapter 4Q DLZ14B** (part no.: 1 822 728 7) can be used to provide a DC link connection at the bottom of the unit:

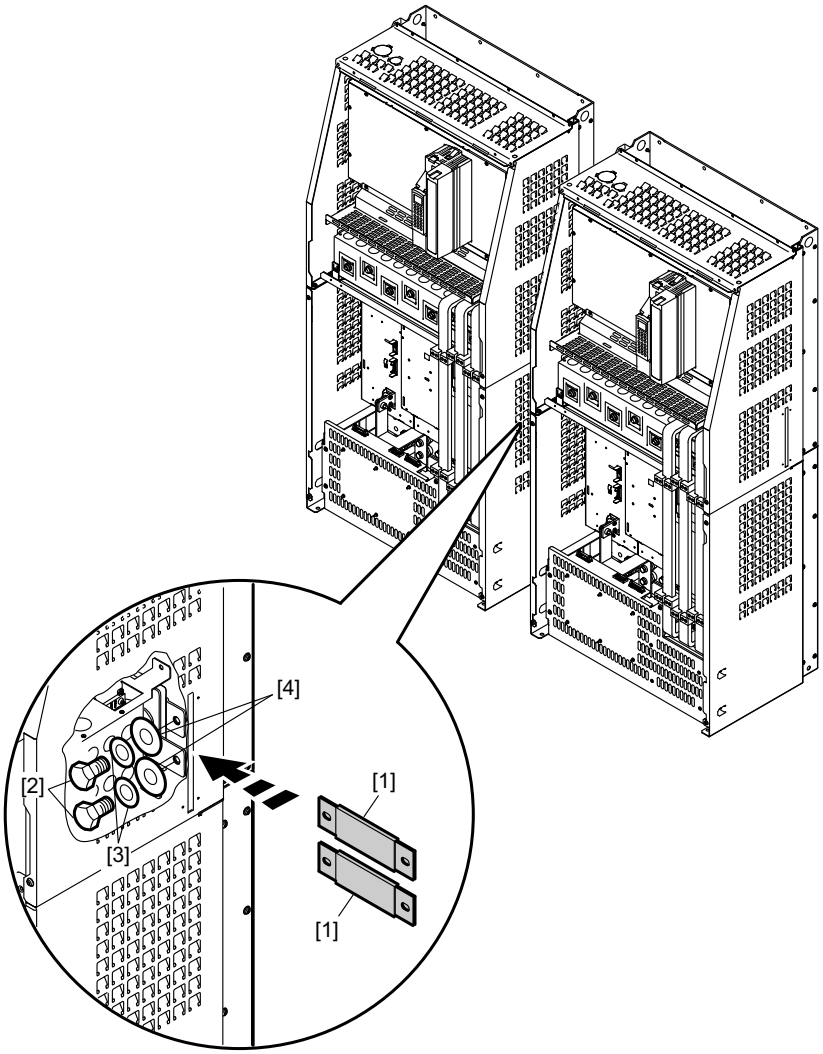


2276334603

1. Loosen the 4 screws of the upper cover and remove it.
2. Loosen the 4 screws of the lower cover and remove it.
3. Position the 2 screws of the conductor rail [1] $-U_Z$ on the brake chopper module (bottom left) on the insulating spacer.
4. Position the 2 screws of the conductor rail [1] $-U_Z$ on the insulating spacer.
5. Tighten all screws of the fixing strap $-U_Z$.
6. Screw on the angle bracket [3].
7. Replace the covers.

DC link coupling

To connect 2 inverters that are installed next to each other, you can use the **DLZ11B DC link coupling** (part no.: 1 823 193 4):



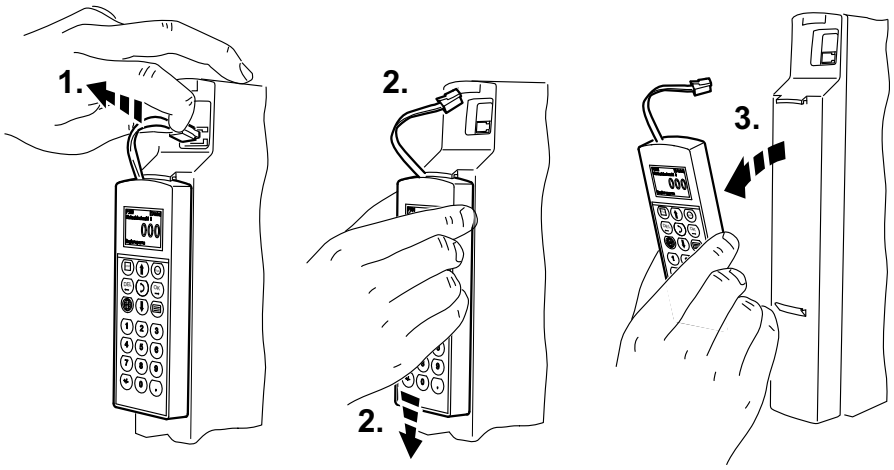
2276338443

1. The units that you want to connect must be installed at ground level and 100 mm apart from each other.
2. Loosen the 4 screws of the upper cover and remove it.
3. Loosen the 4 screws of the lower cover and remove it.
4. Insert the 2 DC link couplings [1] into the units.
5. Screw the DC link coupling [1] to one unit first, before attaching it to the other units.
6. Tighten the screws [2].
7. Replace the covers.

4.2 Removing/installing the keypad

4.2.1 Removing the keypad

Proceed as follows:

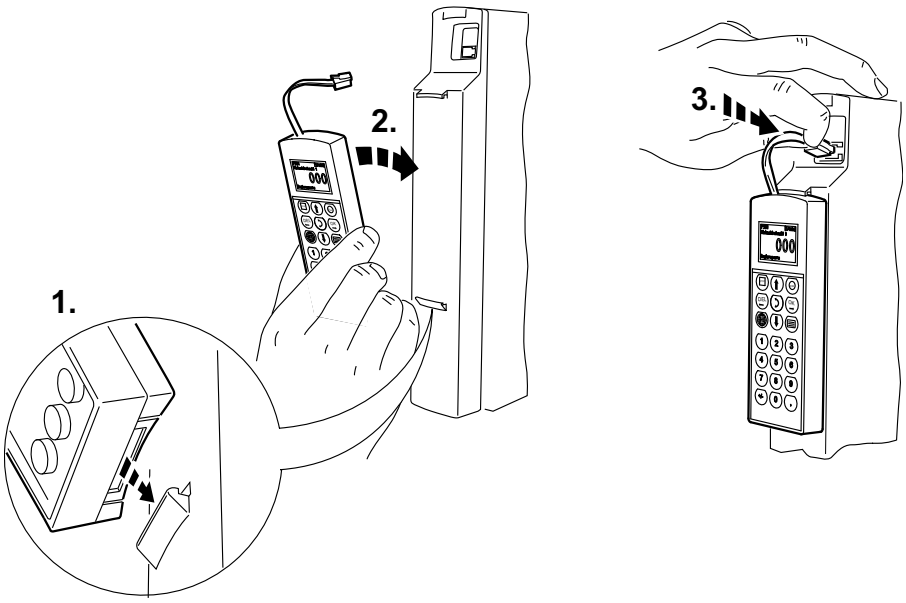


1804920715

1. Unplug the connection cable from the XT slot.
2. Carefully push the keypad downward until it comes off the upper fixture on the front cover.
3. Remove the keypad **forward** (not to the side!).

4.2.2 Installing the keypad

Proceed as follows:



1804922635

1. Place the underside of the keypad onto the lower fixture of the front cover.
2. Push the keypad into the upper fixture of the front cover.
3. Plug the connecting cable into the XT slot.

4.3 Removing/installing the front cover

4.3.1 Removing the front cover

Proceed as follows to remove the front cover:

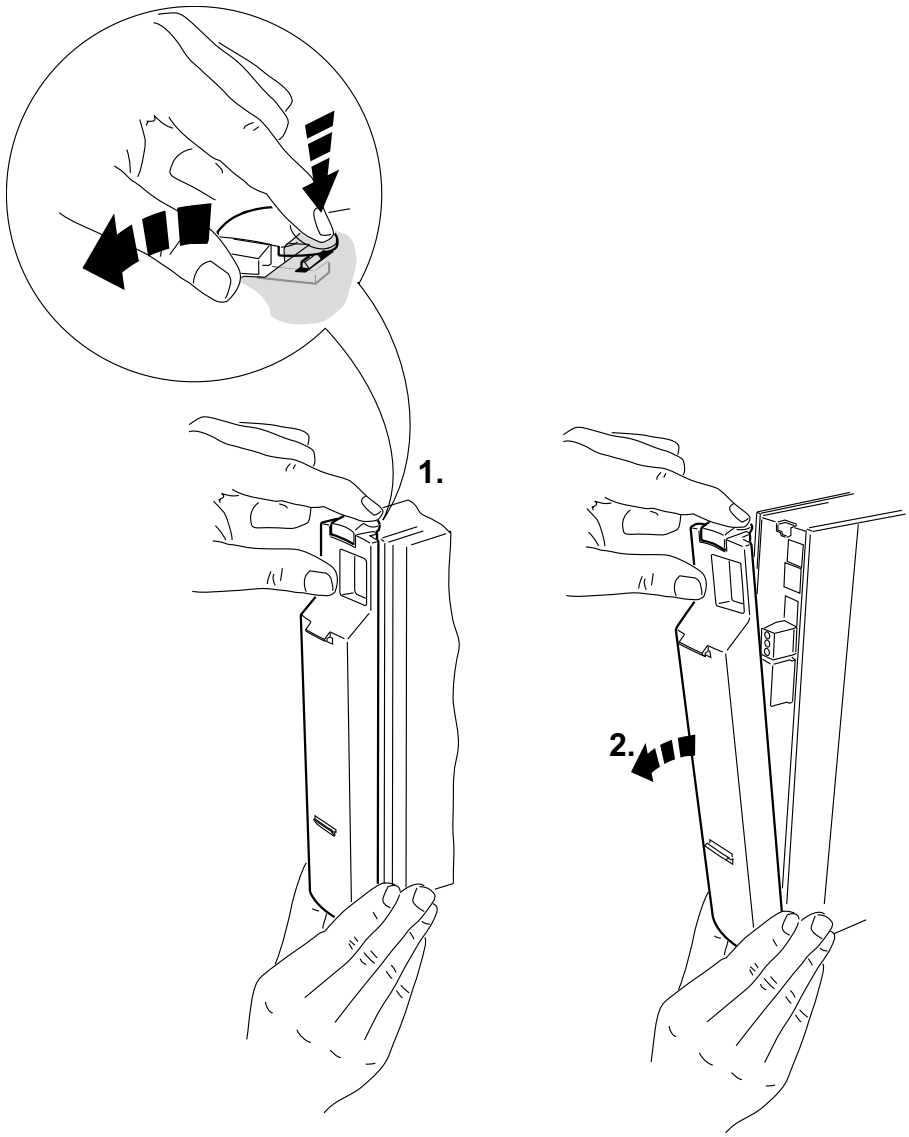


Fig. 9: Removing the front cover

1. If a keypad (page 44) is installed, remove it first.
2. Press the grooved clip on top of the front cover.
3. Keep the clip pressed down to remove the front cover.

4.3.2 Installing the front cover

Proceed as follows to install the front cover:

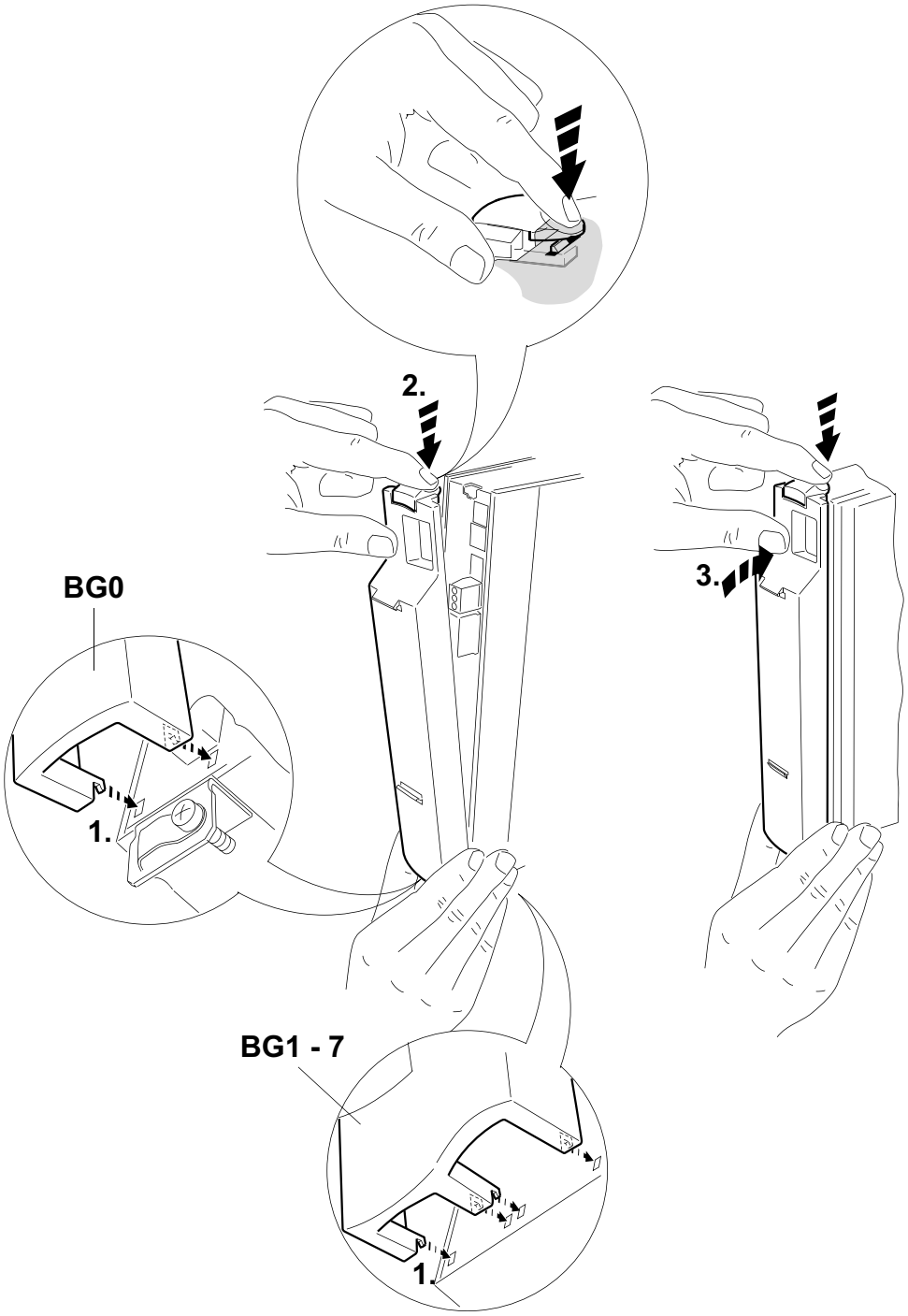


Fig. 10: Installing the front cover

1. Insert the underside of the front cover into the support.
2. Keep the grooved clip on top of the front cover pressed down.
3. Push the front cover onto the unit.

4.4 Information regarding UL

4.4.1 Field wiring power terminals

- Use 60/75 °C copper wire only – Models with suffix 0003 to 0300.

  Use 75 °C copper wire only – Models with suffix 0370 to 2500.

- Tighten terminals to in-lbs (Nm) as follows:

Series	Frame size	in-lbs	Nm
MOVIDRIVE® B	0XS, 0S, 0L	5	0.6
	1, 2S	5	0.6
	2	13	1.5
	3	31	3.5
	4, 5	120	14
	6	180	20
	7	620	70

4.4.2 Short-circuit current rating

- Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes:
  - MOVIDRIVE® B models with suffix 0005 to 0014 and 0055 to 0300 (400 V units only).

    Max. voltage is limited to 500 V.
  - MOVIDRIVE® B models with suffix 0015 to 0150 (230 V units only).

    Max. voltage is limited to 240 V.
- Suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical ampere:
  - MOVIDRIVE® B models with suffix 0015 to 0040 and 0370 to 1320 (400 V units only).

    Max. voltage is limited to 500 V.
  - MOVIDRIVE® B models with suffix 0220 to 0300 (230 V units only).

    Max. voltage is limited to 240 V.
- Suitable for use on a circuit capable of delivering not more than 18,000 rms symmetrical amperes:
  - MOVIDRIVE® B models with suffix 1600 to 2500 (400 V units only).

    Max. voltage is limited to 500 V.

4.4.3 Branch circuit protection

AC 400/500 V units

MOVIDRIVE® MDX60B/61B...5_3	Max. supply short circuit current	Max. supply voltage	Max. fuse rating
0005/0008/0011/0014	AC 5000 A	AC 500 V	AC 15 A / 600 V
0015/0022/0030/0040	AC 10000 A	AC 500 V	AC 35 A / 600 V
0055/0075	AC 5000 A	AC 500 V	AC 60 A / 600 V
0110	AC 5000 A	AC 500 V	AC 110 A / 600 V
0150/0220	AC 5000 A	AC 500 V	AC 175 A / 600 V
0300	AC 5000 A	AC 500 V	AC 225 A / 600 V
0370/0450	AC 10000 A	AC 500 V	AC 350 A / 600 V
0550/0750	AC 10000 A	AC 500 V	AC 500 A / 600 V
0900	AC 10000 A	AC 500 V	AC 250 A / 600 V
1100	AC 10000 A	AC 500 V	AC 300 A / 600 V
1320	AC 10000 A	AC 500 V	AC 400 A / 600 V
1600	AC 18000 A	AC 500 V	AC 400 A / 600 V
2000	AC 18000 A	AC 500 V	AC 500 A / 600 V
2500	AC 18000 A	AC 500 V	AC 600 A / 600 V

AC 230 V units

MOVIDRIVE® MDX61B...2_3	Max. supply short circuit current	Max. supply voltage	Max. fuse rating
0015/0022/0037	AC 5000 A	AC 240 V	AC 30 A / 250 V
0055/0075	AC 5000 A	AC 240 V	AC 110 A / 250 V
0110	AC 5000 A	AC 240 V	AC 175 A / 250 V
0150	AC 5000 A	AC 240 V	AC 225 A / 250 V
0220/0300	AC 10000 A	AC 240 V	AC 350 A / 250 V

4.4.4 Ambient temperature

The units are suitable for an ambient temperature of 40 °C, max. 60 °C with derated output current.

To determine output current rating at higher than 40 °C, the output current should be derated 2.5 % per °C between 40 °C and 50 °C, and 3 % per °C between 50 °C and 60 °C.

INFORMATION

- Use only tested units with a **limited output voltage** (U_{max} = DC 30 V) and **limited output current** (I_{max} = 8 A) as an **external DC 24 V voltage source**.
- **UL certification does not apply to operation in voltage supply systems with a non-grounded star point (IT systems).**

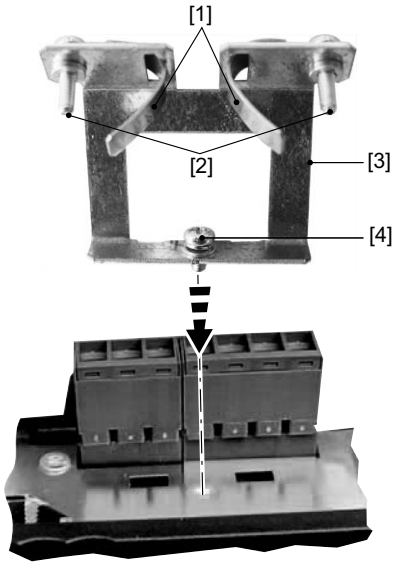
4.5 Shield clamps

4.5.1 Shield clamp for power section, size 0

A set of shield clamps is supplied as standard for the power section of MOVIDRIVE® MDX60B/61B size 0. The shield clamps are not yet installed.

Install the shield clamps for the power section as follows:

- Secure the contact clips to the shield plates.
- Secure the shield clamps to the top and the bottom of the unit.

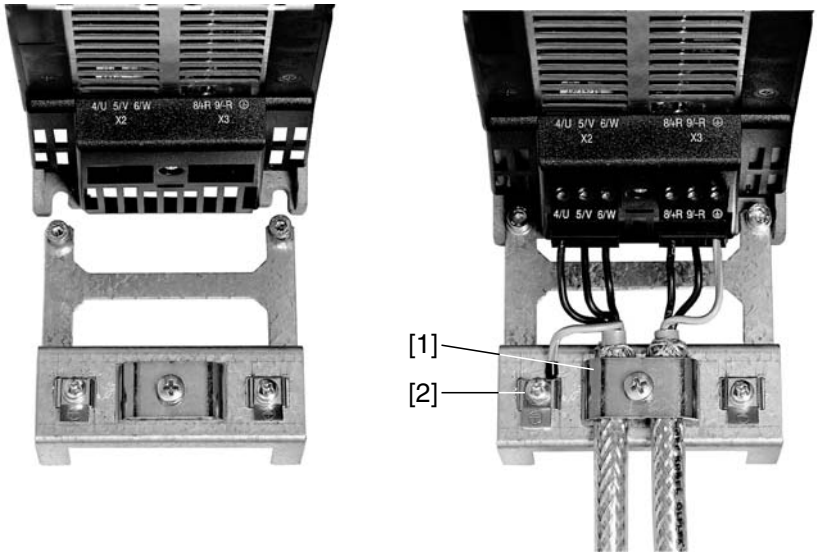


1805286795

[1] Contact clips
[2] Retaining screws for contact clip
[3] Shield plate
[4] Retaining screw for shield clamp

4.5.2 Shield clamp for power section, size 1

A shield clamp is supplied as standard for the power section with MOVIDRIVE® MDX61B size 1. Install this shield clamp on the power section together with the unit's retaining screws.

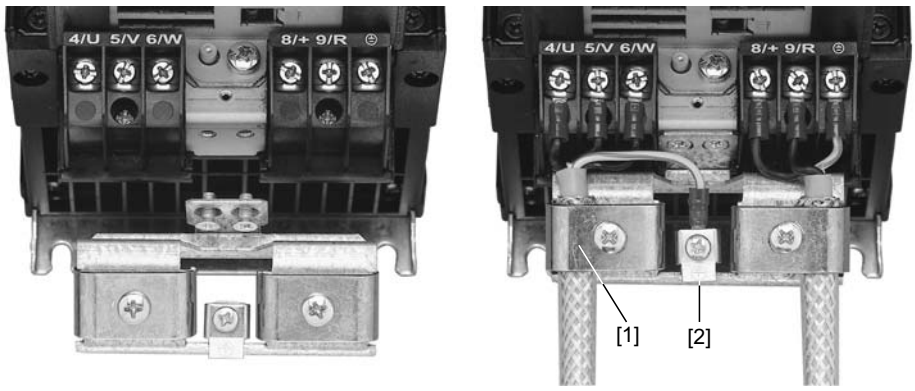


1805289867

[1] Power section shield clamp [2] PE connection (y)

4.5.3 Shield clamp for power section, sizes 2S and 2

A shield clamp for the power section is supplied as standard with two retaining screws with MOVIDRIVE® MDX61B sizes 2S and 2. Install this shield clamp using the two retaining screws.



1805291787

[1] Power section shield clamp [2] PE connection (y)

The shield clamps for the power section provide you with a very convenient way of installing the shield for the motor and brake cables. Apply the shield and PE conductor as shown in the figures below.

4.5.4 Shield clamp for power section, sizes 3 to 7

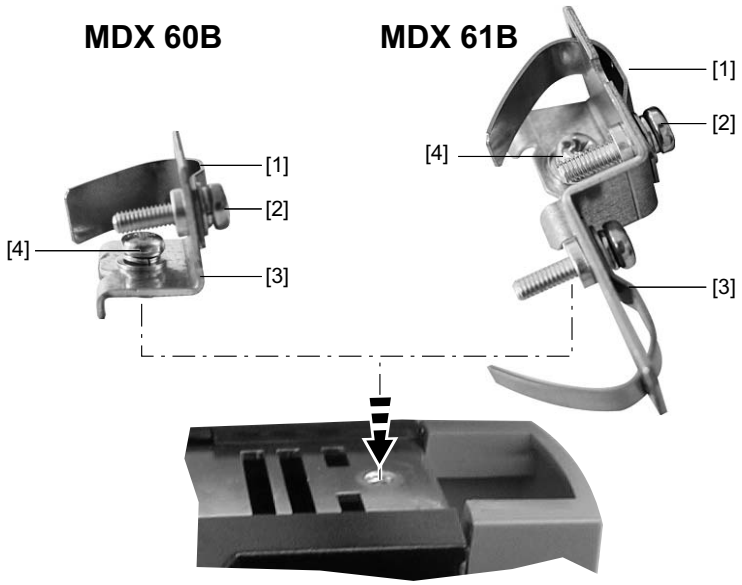
No shield clamps for the power section are supplied with MOVIDRIVE® MDX61B sizes 3 to 7. Use commercially available shield clamps for installing the shielding of motor and brake cables. Apply the shield as closely as possible to the inverter.

4.5.5 Shield clamp for signal cables

Install the shield clamp for the signal cable as follows:

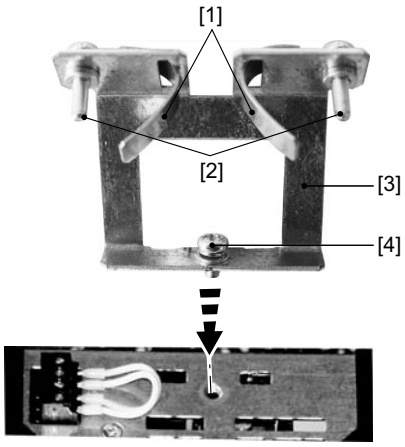
- If installed, remove the keypad and the front cover.
- Size 0: Attach the shield clamp on the bottom of the control unit.
- Sizes 1 to 7: Attach the shield clamp on the bottom of the control unit.

Size 0



1805296011

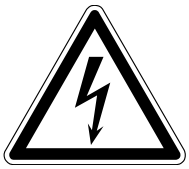
Sizes 1 to 7



1805401483

[1] Contact clip(s)
[2] Retaining screw(s) for contact clips
[3] Shield plate
[4] Retaining screw for shield clamp

4.6 Touch guard for power terminals

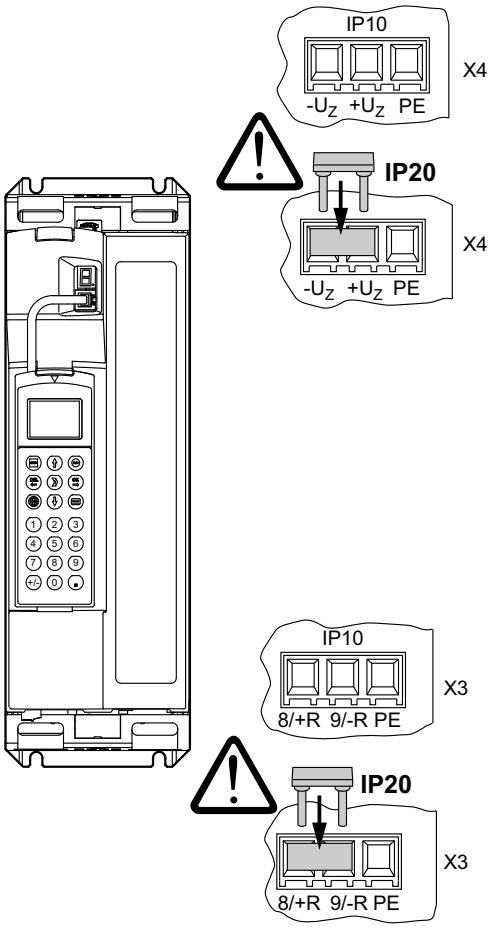
	**⚠ DANGER** Uncovered power connections. Severe or fatal injuries from electric shock. • Install the touch guard according to the regulations. • Never start the unit if the touch guard is not installed.

4.6.1 Size 2S

IP20 is achieved for MOVIDRIVE® MDX61B size 2S if one of the following conditions is fulfilled:

- Touch guard is installed on X3 / X4.
- An adequate cable is connected to X3 / X4

If neither of the two conditions is fulfilled, the degree of protection is IP10.



1805410571

Fig. 4: Touch guard for MOVIDRIVE® MDX61B size 2S

4.6.2 Sizes 4 and 5

IP20 is achieved for MOVIDRIVE® MDX61B sizes 4 and 5 (AC 500 V units: MDX61B0370/0450/0550/0750; AC 230 V units: MDX61B0220/0300), as soon as one of the following conditions is fulfilled:

- Cables with shrink tubing and a cable cross section of ≥ 35 mm^2 (AWG2) are connected to X1, X2, X3, X4. The additional DLB11B touch guard need not be installed.
- Cables with shrink tubing and a cable cross section of < 35 mm^2 (AWG2) are connected to X1, X2, X3, X4. The DLB11B touch guard must be installed properly (see section "Installing the DLB11B touch guard").
- The DLB11B must be connected to power terminals that are not connected. The DLB11B does not have to be connected to the PE terminals.

If neither of the conditions is fulfilled, the degree of protection is IP10. The **DLB11B touch guard (12 pieces included in the scope of delivery)** is available via the **part number 0823 111 7**.

Installing the DLB11B touch guard

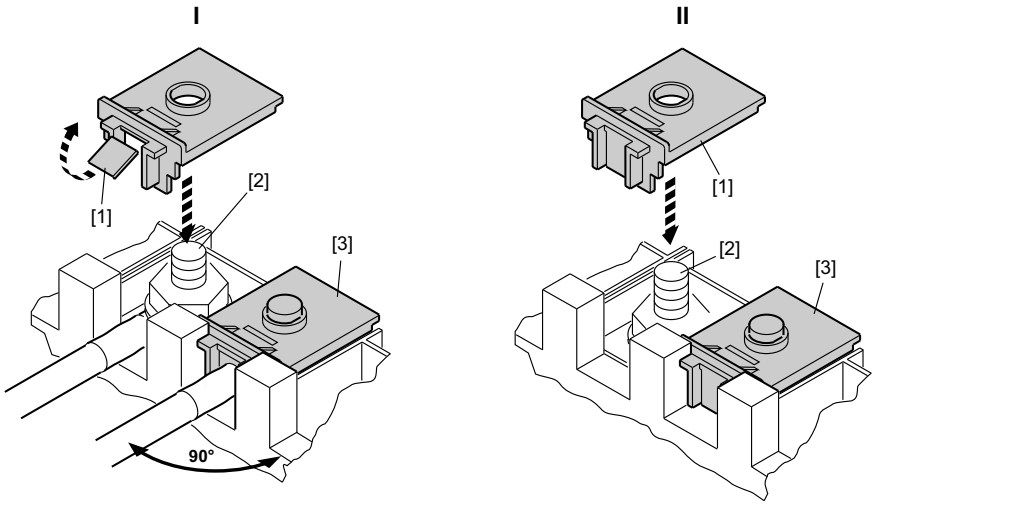
Proceed as follows to install the **DLB11B touch guard**:

- Figure I: Power terminal with connected power cable with a cable cross section of < 35 mm^2 (AWG2):

  Remove the plastic saddle [1] and push the DLB11B touch guard [3] on the respective stud [2] of the power terminal. Make sure that the cable output is straight. Install the cover for the power terminals.

- Figure II: Power terminal without connected power cable:

  Push the DLB11B touch guard [1] on the respective stud [2]. Install the cover for the power terminals.



[1] Plastic saddle
[2] Terminal stud
[3] Correctly mounted touch guard

[1] Touch guard
[2] Terminal stud
[3] Correctly mounted touch guard

For additional information on the X1, X2, X3 and X4 power terminals, refer to the "Technical Data" section.

4.6.3 Sizes 4 - 6

For MOVIDRIVE® size 4 (AC 500 V units: MDX61B0370/0450; AC 230 V units: MDX61B0220/0300), size 5 (MDX61B0550/0750) and size 6 (MDX61B0900/1100/1320), two (2) touch guards with eight (8) retaining screws are supplied as standard. Install the touch guard on both covers of the power terminals.

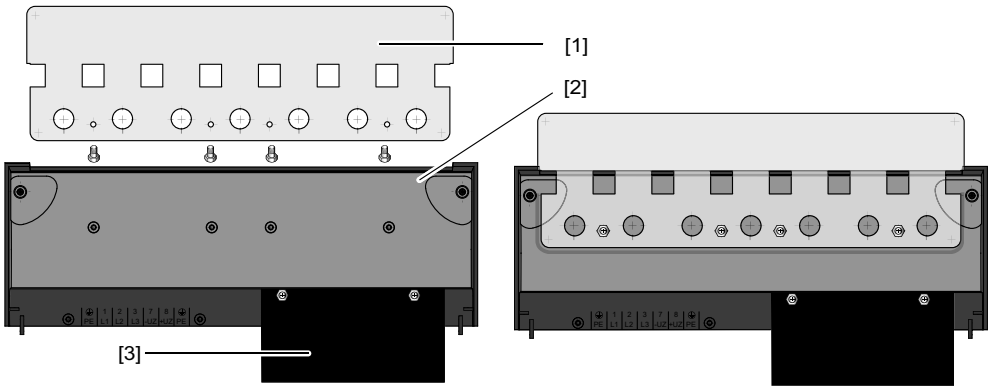


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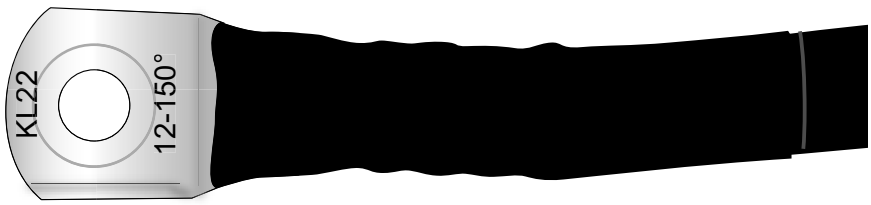
Fig. 5: Touch guard for MOVIDRIVE® MDX61B sizes 4, 5 and 6

The touch guard comprises the following parts:

[1] Cover plate
[2] Connection plate
[3] Screen (only for size 5)

IP10 is only achieved for the MOVIDRIVE® MDX61B units sizes 4, 5 and 6 when the following conditions are fulfilled:

- Touch guard is fully installed
- Shrink tubing is installed on the power cables of all power terminals (X1, X2, X3, X4) (see following picture)



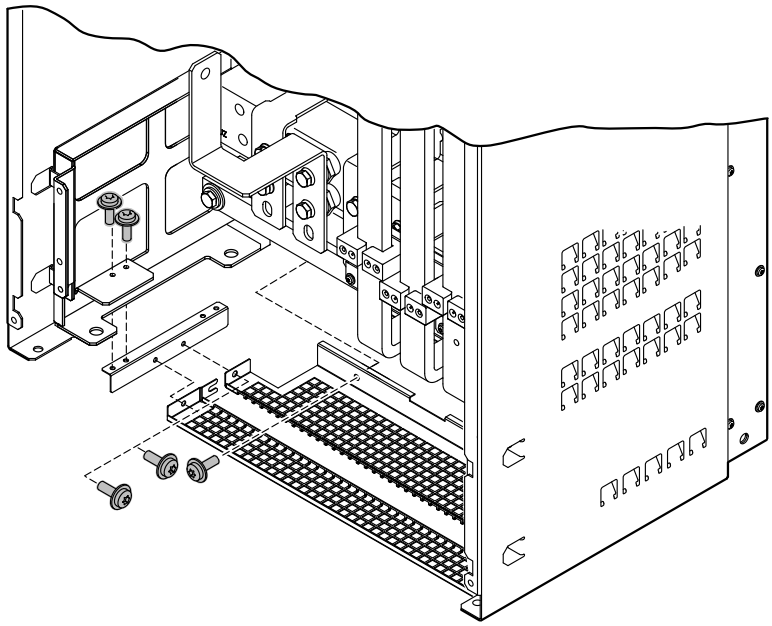
1805525259

	INFORMATION
	If the above conditions are not met, MOVIDRIVE® units sizes 4, 5 and 6 have degree of protection IP00.

4.6.4 Size 7

Installation of touch guard DLB21B

Degree of protection IP20 is achieved for MOVIDRIVE® MDX61B size 7 when the touch guard DLB21B (part no 1 822 608 6) is trimmed to size by the customer and mounted in front and behind the power connections.

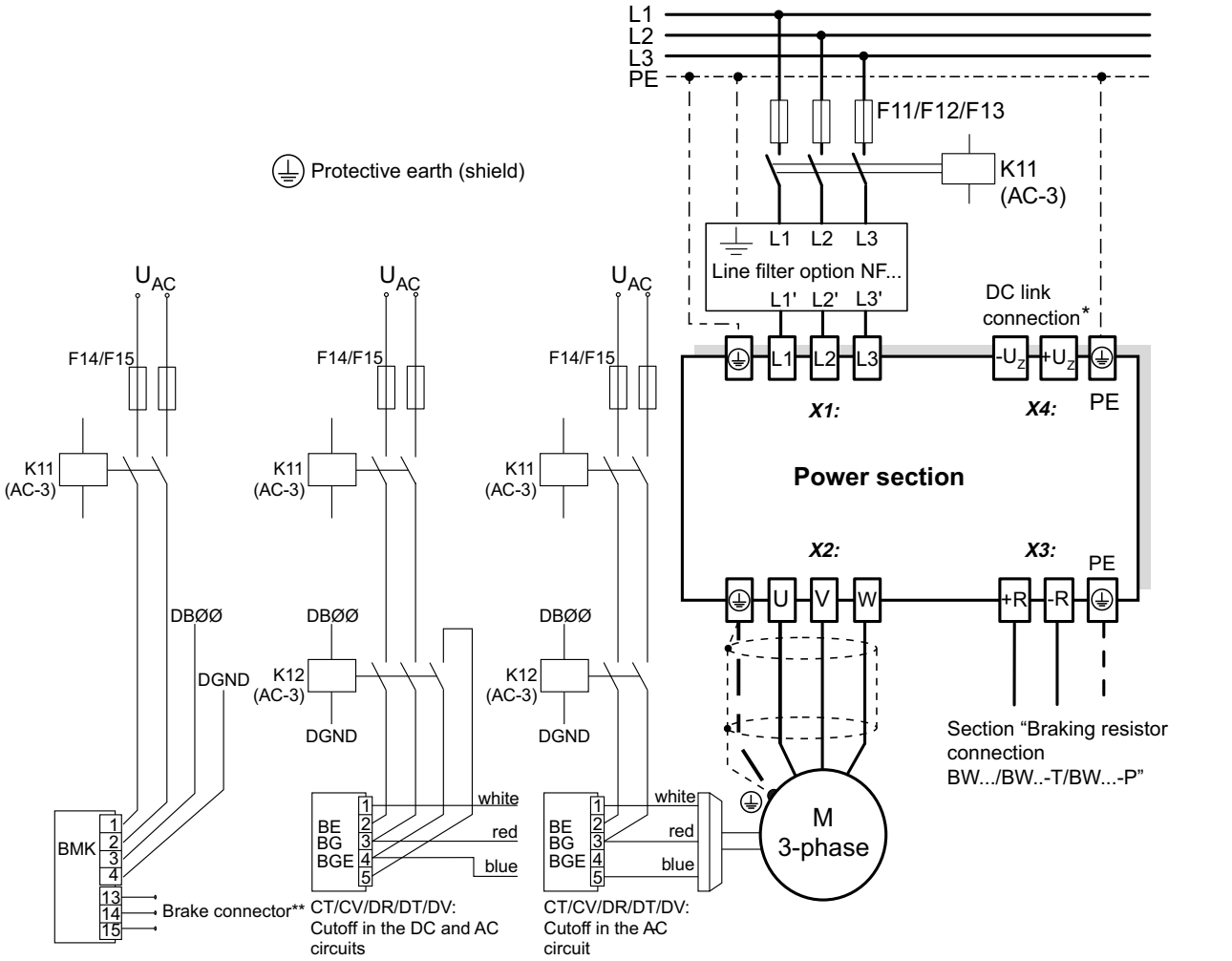


2307312139

	INFORMATION
	If the above conditions are not met, MOVIDRIVE® units size 7 have degree of protection IP00.

4.7 Wiring diagram for basic unit

4.7.1 Power section and brake (size 1-6)



CT/CV, CM71 ... 112: Cutoff in the DC and AC circuits

1805559691

* With sizes 1, 2 and 2S, there is no PE connection next to the supply system connection terminals and motor connection terminals (X1, X2). In this case, use the PE terminal next to the DC link connection (X4).

** **You must adhere to the connection sequence of the brake connector.** Incorrect connection will cause irreparable damage to the brake. **Read the operating instructions for the motors** when connecting the brake using the terminal box.

	INFORMATION
	• Connect the brake rectifier using a separate supply system lead. • **Supply via the motor voltage is not permitted!**

Always switch off the brake on the DC and AC sides with:

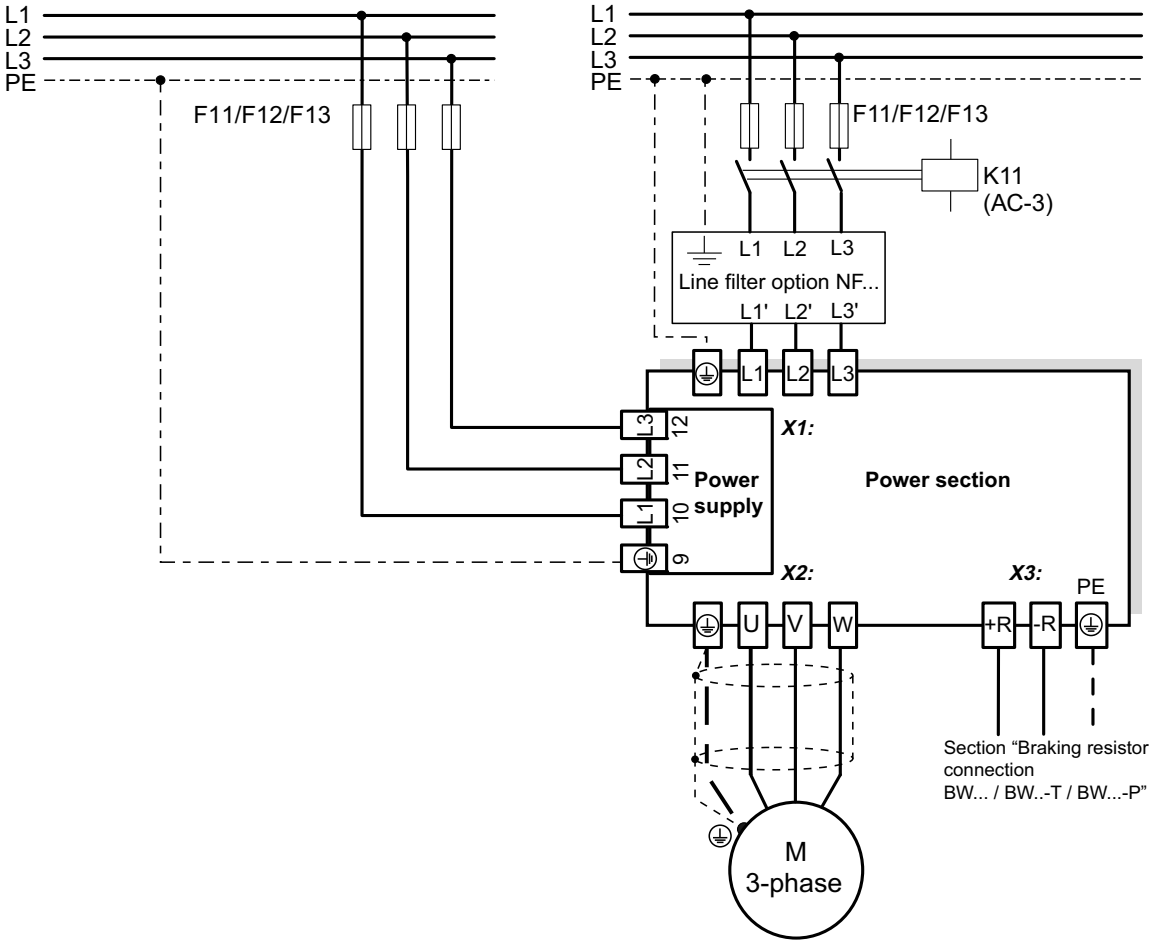
– all hoist applications,

– Drives that require a rapid brake response time

– CFC and SERVO operating modes

4.7.2 Power section and DC power supply unit (size7)

For connecting the brake, refer to the wiring diagram of size 1-6.



2079053451

Technical data of DC power supply unit:

- Rated current: AC 2.4 A
- Inrush current AC 30 A / AC 380 - 500 V

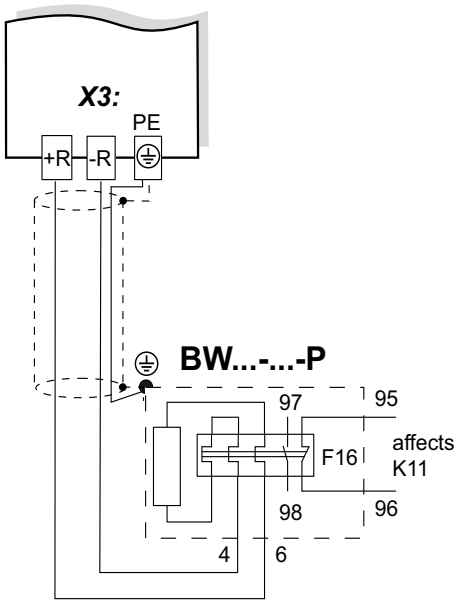
	INFORMATION
	Note that the connection of external +24 V power supply units to the X10:9 control terminal is not permitted in backup mode via power supply unit. Incorrect connection prompts an error message.

4.7.3 Brake rectifier in the control cabinet

Install the connection cables between the brake rectifier and the brake separately from other power cables when installing the brake rectifier in the control cabinet. Joint installation is only permitted with shielded power cables.

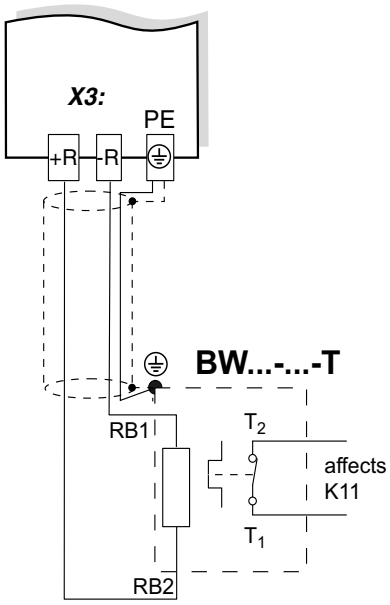
4.7.4 Braking resistor BW... / BW...-...-T /BW...-...-P

Power section



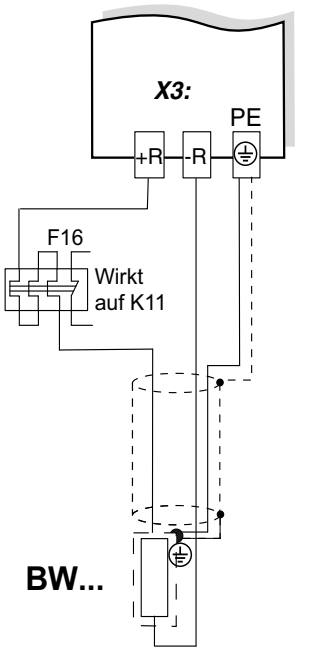
When the signal contact F16 trips, K11 must be opened and DIØØ"/Controller inhibit" must receive a "0" signal. The resistor circuit must not be interrupted!

Power section



When the internal temperature switch trips, K11 must be opened and DIØØ"/Controller inhibit" must receive a "0" signal. The resistor circuit must not be interrupted!

Power section



When the external bimetal relay (F16) trips, K11 must be opened and DIØØ "/Controller inhibit" must receive a "0" signal . The resistor circuit must not be interrupted!

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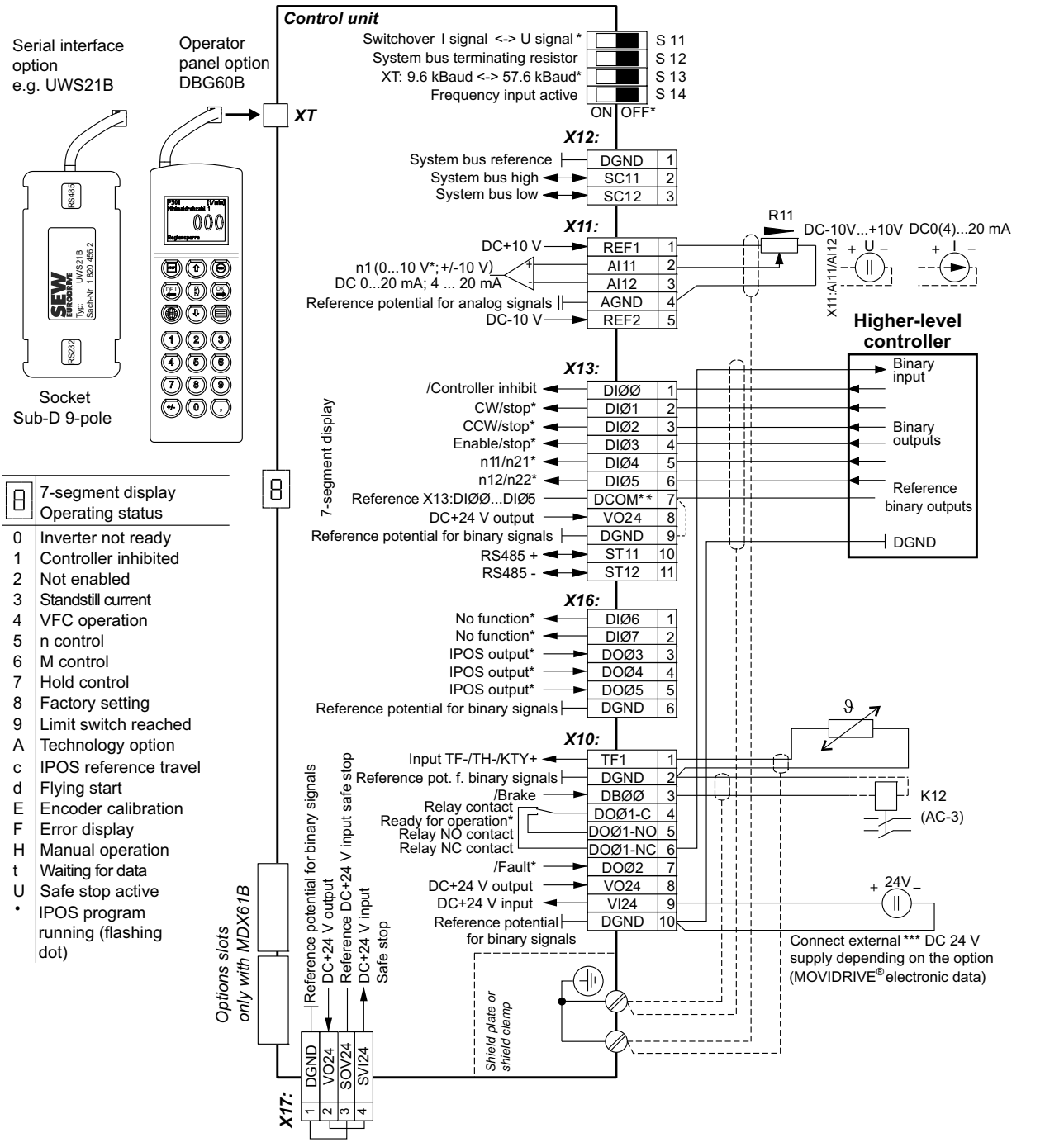
Braking resistor type	Overload protection		
	Design specified	Internal temperature switch (..T)	External bimetallic relay (F16)
BW...	-	-	Required
BW...-...-T	-	One of the two options (internal temperature switch/external bimetallic relay) is required.	
BW...-003 / BW...-005	Adequate	-	Permitted
BW090-P52B	Adequate	-	-

4.7.5 Signal terminals



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* Factory setting

** If the binary inputs are connected to the DC 24 V voltage supply X13:8 "VO24", install a jumper between X13:7 (DCOM) and X13:9 (DGND) on MOVIDRIVE®.

DGND (X10, X12, X13, X16, X17) is connected with PE as standard (threaded hole, see section "Unit structure"). You can establish galvanic isolation by removing the M4 x 14 grounding screw.

*** External voltage supply via X:10 only for size 0-6. With size 7, the 24 V backup voltage must be connected via the DC power supply unit.

4.7.6 Description of terminal functions on the basic unit (power section and control unit)

Terminal		Function	
X1:1/2/3 **X2:4/5/6** **X3:8/9** **X4:**	**L1/L2/L3 (PE)** **U/V/W (PE)** **+R/-R (PE)** **+U_Z/-U_Z (PE)**	Supply system connection Motor connection Braking resistor connection DC link connection	
9,10,11,12	**L1/L2/L3/PE**	Connection of switched-mode power supply (only for size 7)	
S11: **S12:** **S13:** **S14:**		Change I-signal DC(0(4)...20 am) ↔ V-signal DC(-10 V...0...10 V, 0...10 V), factory setting to V signal. Switching system bus terminating resistor on/off; factory setting: OFF. Set baud rate for the RS485 interface XT. Either 9.6 or 57.6 baud, factory setting: 75.6 baud. Switch frequency input on or off, factory setting: switched off.	
X12:1 **X12:2** **X12:3**	**DGND** **SC11** **SC12**	Reference potential system bus System bus high System bus low	
X11:1 **X11:2/3** **X11:4** **X11:5**	**REF1** **AI11/12** **AGND** **REF2**	DC+10 V (max. DC 3 am) for setpoint potentiometer Setpoint input n1 (differential input or input with AGND reference potential), signal form → P11_/ S11 Reference potential for analog signals (REF1, REF2, AI.., AO..) DC–10 V (max. DC 3 mA) for setpoint potentiometer	
X13:1 **X13:2** **X13:3** **X13:4** **X13:5** **X13:6**	**DIØØ** **DIØ1** **DIØ2** **DIØ3** **DIØ4** **DIØ5**	Binary input 1, with fixed assignment "/Controller inhibit" Binary input 2, factory setting "CW/stop" Binary input 3, factory setting "CCW/stop" Binary input 4, factory setting "Enable/stop" Binary input 5, factory setting "n11/n21" Binary input 6, factory setting "n12/n22"	• The binary inputs are electrically isolated by optocouplers. • Selection options for binary inputs 2 to 6 (DIØ1 ... DIØ5) → Parameter menu P60_
X13:7	**DCOM**	Reference for binary inputs X13:1 to X13:6 (DIØØ to DIØ5) and X16:1/X16:2 (DIØ6 to DIØ7) • Switching binary inputs with DC+24 V external voltage: Connection X13:7 (DCOM) must be connected to the reference potential of the external voltage. – Without jumper X13:7-X13:9 (DCOM-DGND) → Isolated binary inputs – With jumper X13:7-X13:9 (DCOM-DGND) → Non-isolated binary inputs • The binary inputs must be switched with DC+24 V from X13:8 or X10:8 (VO24) → Jumper required X13:7-X13:9 (DCOM-DGND).	
X13:8 **X13:9** **X13:10** **X13:11**	**VO24** **DGND** **ST11** **ST12**	Auxiliary supply output DC+24 V (max. load X13:8 **and** X10:8 = 400 mA) for external command switches Reference potential for binary signals RS485+ (baud rate has a fixed setting of 9.6 kBaud) RS485-	
X16:1 **X16:2** **X16:3** **X16:4** **X16:5** **X16:6**	**DIØ6** **DIØ7** **DOØ3** **DOØ4** **DOØ5** **DGND**	Binary input 7, factory setting "No function" Binary input 8, factory setting "No function" Binary output 3, factory setting "IPOS output" Binary output 4, factory setting "IPOS output" Binary output 5, factory setting "IPOS output" **Do not connect external voltage to binary outputs X16:3 (DOØ3) and X16:5 (DOØ5)!** Reference potential for binary signals	• The binary inputs are electrically isolated by optocouplers. • Selection options for binary inputs 7 to 8 (DIØ6/ DIØ7) → Parameter menu P60_ • Selection options for binary outputs 3 to 5 (DOØ3...DOØ5) → Parameter menu P62_

Terminal		Function
X10:1	**TF1**	KTY+/TF-/TH connection (connect to X10:2 via TF/TH), factory set to "No response" (→ P835)
X10:2	**DGND**	Reference potential for binary signals / KTY–
X10:3	**DBØØ**	Binary output DBØØ with fixed assignment "/Brake", load capacity max DC 150 mA (short-circuit proof, protected against external voltage to DC 30 V)
X10:4	**DOØ1-C**	Shared contact binary output 1, factory setting "Ready"
X10:5	**DOØ1-NO**	Normally open contact binary output 1, max. load of relay contacts DC 30 V and DC 0.8 A
X10:6	**DOØ1-NC**	NC contact binary output 1
X10:7	**DOØ2**	Binary output DBØ2, factory set to "/Fault", max. load capacity DC 50 mA (short-circuit proof, protected against external voltage to DC 30 V). Selection options for binary outputs 1 and 2 (DOØ1 and DOØ2) → Parameter menu P62_. Do not apply external voltage to binary outputs X10:3 (DBØØ) and X10:7 (DOØ2).
X10:8	**VO24**	Auxiliary supply output DC+24 V (max. load X13:8 **and** X10:8 = 400 mA) for external command switches
X10:9	**VI24**	Input DC+24 V voltage supply (backup voltage depending on options, unit diagnosis when supply system off)
X10:10	**DGND**	Reference potential for binary signals **Note for X:10.9: Only connect external backup voltage DC +24 V to sizes 0-6. With size 7, the DC power supply unit must be connected to the supply system. Refer to section "Power section and DC power supply unit (size 7)" (page 58).**
X17:1	**DGND**	Reference potential for X17:2
X17:2	**VO24**	Auxiliary supply voltage DC+24 V, **only to supply X17:4 on the same unit**
X17:3	**SOV24**	Reference potential for DC+24 V "safe stop" input (safety contact)
X17:4	**SVI24**	DC+24 V "safe stop" input (safety contact)
XT		Only service interface. Option slot: DBG60B / UWS21B / USB11A

4.8 Assignment of braking resistors, chokes and filters

4.8.1 AC 400/500 V units, size 0

MOVIDRIVE® MDX60/61B...-5A3 Size				0005	0008	0011	0014
				0			
Braking resistors BW... / BW..-..-T	**Trip current**	**Part number BW...**	**Part number BW...-...-T**				
BW090-P52B[1)]	-	824 563 0					
BW072-003	I_F = 0.8 A	826 058 3					
BW072-005	I_F = 1.2 A	826 060 5					
BW168/BW168-T	I_F = 3.6 A	820 604 X	1820 133 4				
BW100-006 BW100-006-T	I_F = 2.4 A	821 701 7	1820 419 8				
Line chokes		**Part number**					
ND020-013	ΣI_{line} = AC 20 A	826 012 5					
Line filter		**Part number**					
NF009-503	U_{max} = AC 550 V	827 412 6					
Output chokes	**Inner diameter**	**Part number**					
HD001	d = 50 mm (2 in)	813 325 5		for cable cross sections 1.5 to 16 mm² (AWG 16 to 6)			
HD002	d = 23 mm (0.91 in)	813 557 6		For cable cross sections ≤ 1.5 mm² (AWG 16)			
Output filter (only in VFC operating mode)		**Part number**					
HF008-503		826 029 X			A		
HF015-503		826 030 3			B		A
HF022-503		826 031 1					B

1) Internal thermal overload protection, no bimetallic relay required.

A **In rated operation (100 %)**
B **With variable torque load (125 %)**

4.8.2 AC 400/500 V units, sizes 1, 2S, and 2

MOVIDRIVE® MDX61B...-5A3 Size				0015	0022	0030	0040	0055	0075	0110
				1				2S		2
Braking resistors BW... / BW..-..-T	**Trip current**	**Part number BW...**	**Part number BW...-...-T**							
BW100-005	I_F = 1.0 A	826 269 1								
BW100-006/ BW100-006-T	I_F = 2.4 A	821 701 7	1820 419 8							
BW168/BW168-T	I_F = 3.6 A	820 604 X	1820 133 4							
BW268/BW268-T	I_F = 4.2 A	820 715 1	1820 417 1							
BW147/BW147-T	I_F = 5.1 A	820 713 5	1820 134 2							
BW247/BW247-T	I_F = 6.5 A	820 714 3	1820 084 2							
BW347/BW347-T	I_F = 9.2 A	820 798 4	1820 135 0							
BW039-012/ BW039-012-T	I_F = 5.5 A	821 689 4	1820 136 9							
BW039-026-T	I_F = 8.2 A		1820 415 5							
BW039-050-T	I_F = 11.3 A		1820 137 7							
Line chokes		**Part number**								
ND020-013	ΣI_{line} = AC 20 A	826 012 5								
ND045-013	ΣI_{line} = AC 45 A	826 013 3								
Line filter		**Part number**								
NF009-503	U_{max} = AC 550 V	827 412 6					A			
NF014-503		827 116 X					B		A	
NF018-503		827 413 4							B	
NF035-503		827 128 3								
Output chokes	**Inner diameter**	**Part number**								
HD001	d = 50 mm (2 in)	813 325 5		For cable cross sections 1.5 – 16 mm² (AWG 16 – 26)						
HD002	d = 23 mm (0.91 in)	813 557 6		For cable cross sections ≤ 1.5 mm² (AWG 16)						
HD003	d = 88 mm (3.5 in)	813 558 4		for cable cross sections > 16 mm² (AWG 6)						
Output filter (only in VFC operating mode)		**Part number**								
HF015-503		826 030 3		A						
HF022-503		826 031 1		B	A					
HF030-503		826 032 X			B	A				
HF040-503		826 311 6				B	A			
HF055-503		826 312 4					B	A		
HF075-503		826 313 2						B	A	
HF023-403		825 784 1							B	A
HF033-403		825 785 X								B

A In rated operation (100 %)
B With variable torque load (125 %)

4.8.3 AC 400/500 V units, sizes 3 and 4

MOVIDRIVE® MDX61B...-503 Size					0150	0220 3	0300	0370	0450 4
Braking resistors BW... / BW...-...-T BW...-...-P	**Trip current**	**Part number BW...**	**Part number BW...-...-T**	**Part number BW...-...-P**					
BW018-015/ BW018-015-P	**I_F = 9.1 A**	**821 684 3**		**1 820 416 3**				**C**	**C**
BW018-035-T	**I_F = 13.9 A**		**1820 138 5**					**C**	**C**
BW018-075-T	**I_F = 20.4 A**		**1820 139 3**					**C**	**C**
BW915-T	**I_F = 32.7 A**		**1820 413 9**						
BW012-025/ BW012-025-P	**I_F = 14.4A**	**821 680 0**		**1 820 414 7**					
BW012-050-T	**I_F = 20.4 A**		**1820 140 7**						
BW012-100-T	**I_F = 28.9 A**		**1820 141 5**						
BW106-T	**I_F = 47.4 A**		**1820 083 4**						
BW206-T	**I_F = 54.8 A**		**1820 412 0**						
Line chokes		**Part number**							
ND045-013	**ΣI_{line} = AC 45 A**	**826 013 3**				**A**			
ND085-013	**ΣI_{line} = AC 85 A**	**826 014 1**				**B**			**A**
ND150-013	**ΣI_{line} = AC 150 A**	**825 548 2**							**B**
ND300-0053	**ΣI_{line} = AC 300 A**	**827 721 4**							
Line filter		**Part number**							
NF035-503	**U_{max} = AC 550 V**	827 128 3			**A**				
NF048-503		827 117 8			**B**	**A**			
NF063-503		827 414 2				**B**	**A**		
NF085-503		827 415 0					**B**		**A**
NF115-503		827 416 9							**B**
Output chokes	**Inner diameter**	**Part number**							
HD001	**d = 50 mm**	**813 325 5**	For cable cross sections 1.5 – 16 mm² (AWG 16 – 6)						
HD003	**d = 88 mm**	**813 558 4**	for cable cross sections > 16 mm² (AWG 6)						
Output filter (only in VFC operating mode)		Part number							
HF033-403		**825 785 X**			**A**	**B / D**	**A / D**		
HF047-403		**825 786 8**			**B**	**A**			
HF450-503		**826 948 3**					**B**		**E**

A In rated operation (100 %)
B With variable torque load (125 %)
C Connect two braking resistors in parallel and set twice the trip current on F16 (2 × I_F)
D Connect three braking resistors in parallel and set three times the trip current on F16 (3 × I_F)
E Connect four braking resistors in parallel and set four times the trip current on F16 (4 × I_F)

4.8.4 AC 400/500 V units, sizes 5 to 7

MOVIDRIVE® MDX61B...-503			0550	0750	0900	1100	1320	1600	2000	2500
Size			5		6			7		
Braking resistors BW...-...-T	**Trip current**	**Part number BW...-...-T**								
BW106-T	I_F = 47.4 A	1820 083 4			C	C	C	D	E	F
BW206-T	I_F = 54.8 A	1820 412 0			C	C	C	D	E	F
BW1.4-170-T	I_F = 110 A	1330 152 7								
BW003-420-T	I_F = 129 A	1330 234 5						C	C	C
Line filter		**Part number**								
NF115-503	U_{max} = AC 550 V	827 416 9	A							
NF150-503		827 417 7	B							
NF210-503		827 418 5				A				
NF300-503		827 419 3				B				
NF600-503		1 796 338 9						B	B	B
Output chokes	**Inner diameter**	**Part number**								
HD001	d = 50 mm	813 325 5	For cable cross sections 1.5 – 16 mm² (AWG 16 – 6)							
HD003	d = 88 mm	813 558 4	for cable cross sections > 16 mm² (AWG 6)							
HD004	Connection with M12 bolt	816 885 7								
HD005	Connection With M12 cable lug, M10 PE connection	1 796 336 2						B	B	B
Output filter (only in V/f and VFC operating mode)		**Part number**								
HF450-503		826 948 3	H	H						
HF180-403		829 909 9								
HF325-403		829 948 3								

A In rated operation (100 %)
B With variable torque load (125 %)
C Connect two braking resistors in parallel and set twice the trip current on F16 ($2 \times I_F$)
D Connect three braking resistors in parallel and set three times the trip current on F16 ($3 \times I_F$)
E Connect four braking resistors in parallel and set four times the trip current on F16 ($4 \times I_F$)
F Connect five braking resistors in parallel and set five times the trip current on F16 ($5 \times I_F$)
H Two filter in parallel

4.8.5 AC 230 V units, sizes 1 to 4

MOVIDRIVE® MDX61B...-2_3 Size				0015	0022	0037	0055	0075	0110	0150	0220	0300
				1			2		3		4	
Braking resistors **BW...-.../** **BW...-...-T** **BW...-...-P**	**Trip current**	**Part number BW...**	**Part number BW...-...-T**									
BW039-003	I_F = 2.7 A	821 687 8										
BW039-006	I_F = 3.9 A	821 688 6										
BW039-012 **BW039-012-T**	I_F = 5.5 A	821 689 4	1 820 136 9									
BW039-026-T	I_F = 8.1 A		1 820 415 5									
BW027-006	I_F = 4.7 A	822 422 6										
BW027-012	I_F = 6.6 A	822 423 4										
BW018-015-T	I_F = 9.1 A		1 820 416 3						C	C	C	C
BW018-035-T	I_F = 13.9 A		1 820 138 5						C	C	C	C
BW018-075-T	I_F = 20.4 A		1 820 139 3						C	C	C	C
BW915-T	I_F = 32.6 A		1 820 413 9						C	C	C	C
BW012-025-P	I_F = 14.4 A		1 820 414 7									
BW012-050-T	I_F = 20.4 A		1 820 140 7									
BW012-100-T	I_F = 28.8 A		1 820 141 5									
BW106-T	I_F = 47.4 A		1 820 083 4								C	C
BW206-T	I_F = 54.7 A		1 820 412 0								C	C

Line chokes		Part number										
ND020-013	S I_{line} = AC 20 A	826 012 5					A					
ND045-013	S I_{line} = AC 45 A	826 013 3					B		A			
ND085-013	S I_{line} = AC 85 A	826 014 1							B		A	
ND150-013	S I_{line} = AC 150 A	825 548 2									B	

Line filter		Part number										
NF009-503	U_{max} = AC 550 V	827 412 6		A								
NF014-503		827 116 X		B	A							
NF018-503		827 413 4			B							
NF035-503		827 128 3										
NF048-503		827 117 8							A			
NF063-503		827 414 2							B			
NF085-503		827 415 0									A	
NF115-503		827 416 9									B	

Output chokes	Inner diameter	Part number	
HD001	**d = 50 mm (2 in)**	**813 325 5**	for cable cross sections 1.5 to 16 mm^2 (AWG 16 to 6)
HD002	**d = 23 mm (0.91 in)**	**813 557 6**	For cable cross sections ≤ 1.5 mm^2 (AWG 16)
HD003	**d = 88 mm (3.5 in)**	**813 558 4**	for cable cross sections > 16 mm^2 (AWG 6)

A **In rated operation (100 %)**
B **With variable torque load (125 %)**
C **Connect two braking resistors in parallel and set twice the trip current on F16 (2 × I_F)**

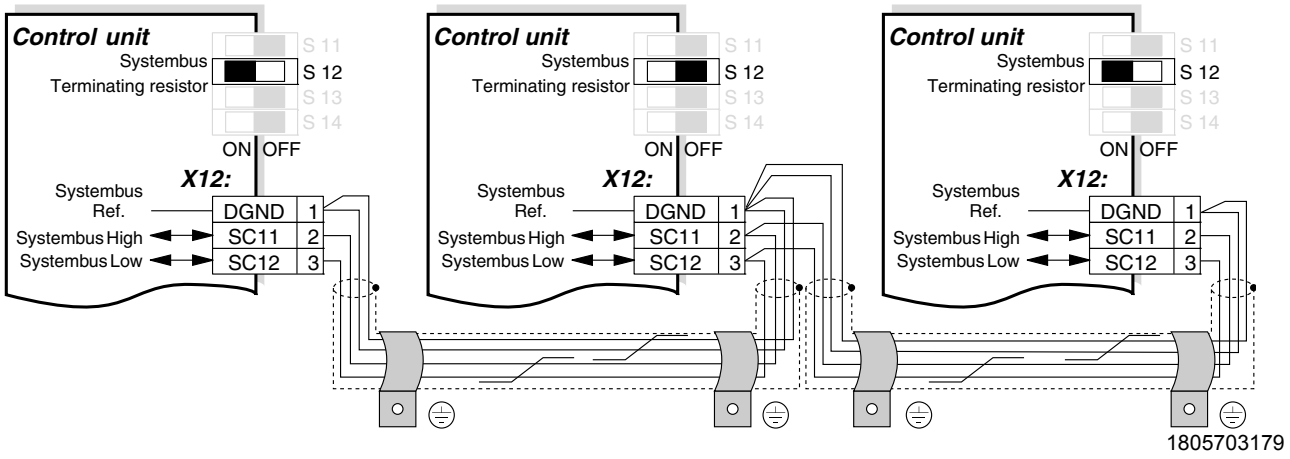
4.9 Connecting the system bus (SBus 1)

	INFORMATION
	Only when P884 "SBus baud rate" = 1000 kBaud: MOVIDRIVE® *compact* MCH4_A units are not allowed to be combined with other MOVIDRIVE® units in the same system bus combination. The units are allowed to be mixed when baud rates ≠ 1000 kBaud.

Max. 64 CAN bus stations can be addressed via system bus (SBus). Use a repeater after 20 or 30 nodes, depending on the length of the cables and the cable capacity. The SBus supports transmission technology compliant with ISO 11898.

The "Serial Communication" manual contains detailed information about the system bus that can be ordered from SEW-EURODRIVE.

4.9.1 SBus wiring diagram



Cable specification

- Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Cable cross section 0.25 ... 0,75 mm^2 (AWG 23 to AWG 19)
  - Cable resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz

  Suitable cables include CAN bus or DeviceNet cables.

Connecting the shield

- Connect the shield to the electronics shield clamp on the inverter or master controller and make sure it is connected over a wide area at both ends.

Cable length

- The permitted total cable length depends on the baud rate setting of the SBus (P884):
  - 125 kBaud → 320 m (1050 ft)
  - 250 kBaud → 160 m (525 ft)
  - **500 kBaud → 80 m (260 ft)**
  - 1000 kBaud → 40 m (130 ft)

Terminating resistor

- Switch on the system bus terminating resistor (S12 = ON) at the start and end of the system bus connection. Switch off the terminating resistor on the other units (S12 = OFF).

NOTICE

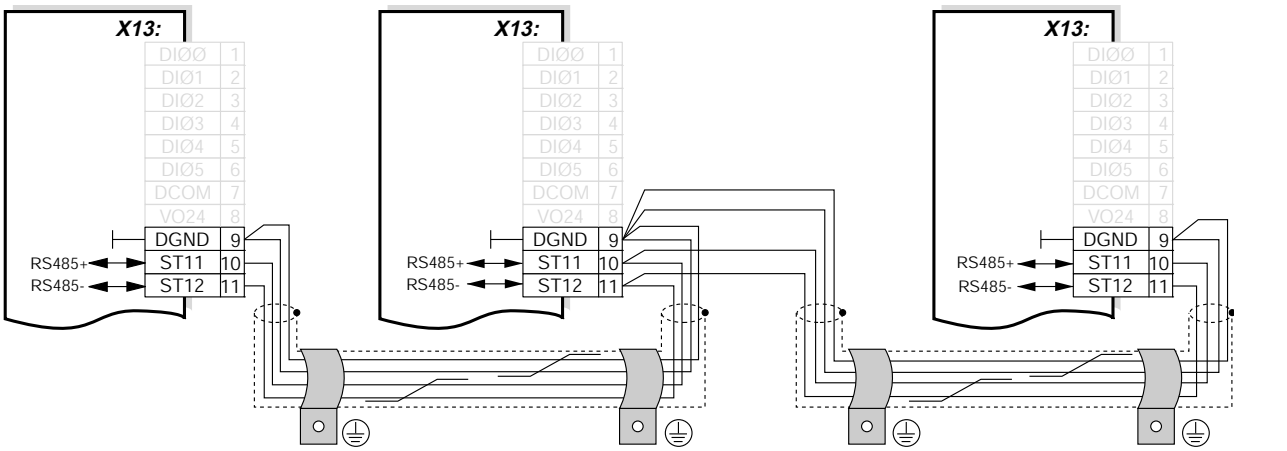
There must not be any potential displacement between the units connected with the SBus. This may affect the functionality of the units.

Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

4.10 Connecting the RS485 interface

The RS485 interface (X13:ST11, ST12) can be used for connecting max. 32 MOVIDRIVE® units, e.g. for master/slave operation, or 31 MOVIDRIVE® units and a master control system (PLC). The baud rate is set to 9.6 baud by default.

4.10.1 Wiring diagram of the RS485 interface (X13)



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Cable specification

- Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Cable cross section 0.25 ... 0,75 mm^2 (AWG 23 to AWG 19)
  - Cable resistance 100 ... 150 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz

Connecting the shield

- Connect the shield to the electronics shield clamp on the inverter or higher-level controller and make sure it is connected over a wide area at both ends.

Cable length

- The permitted total cable length is 200 m (656 ft).

Terminating resistor

- Dynamic terminating resistors are installed. **Do not connect any external terminating resistors.**

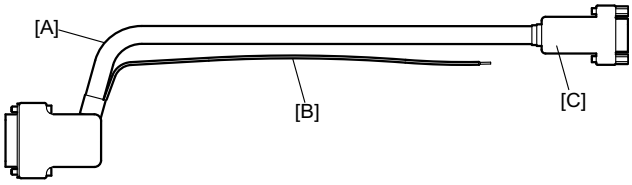
	NOTICE
	There must not be any potential displacement between the units connected via the RS485. This may affect the functionality of the units. Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

4.11 Connecting the interface adapter option type DWE11B/12B

4.11.1 Part number and description

- DWE11B, part number 188 187 6

  The interface adapter DWE11B (HTL→TTL) in the form of an adapter cable is used **to connect single-ended HTL encoders to theDEH11B/DEH21B option**. Only the A, B and C tracks are connected. The interface adapter is suitable for all HTL encoders that were operated on MOVIDRIVE® A, MDV and MCV and can be connected without any rewiring effort.



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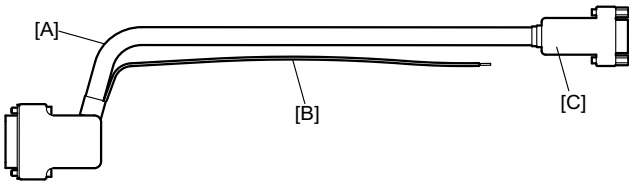
[A] 5 x 2 x 0.25 mm^2 (AWG 23) / length 1000 mm (39.37 in) / max. cable length inverter - encoder: 100 m (328 ft)
[B] DC 24 V connection for HTL encoder; 1 x 0.5 mm^2 (AWG 20) / length 250 mm (9.84 in)

Signal	Terminal of 9-pin sub D socket [C] (encoder end)
A	1
B	2
C	3
UB	9
GND	5

- DWE12B, part number 188 180 9

  The interface adapter DWE12B (HTL→TTL) in the form of an adapter cable is used **to connect single-ended HTL encoders to theDEH11B/DEH21B option**. In addition to the A, B and C track, you will also have to connect the negated tracks ($\overline{A}$, $\overline{B}$, $\overline{C}$). SEW-EURODRIVE recommends using this interface adapter for any new system.



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[A] 4 x 2 x 0.25 mm^2 (AWG 23) / length 1000 mm (39.37 in) / max. cable length inverter - encoder: 200 m (656 ft)
[B] DC 24 V connection for HTL encoder; 1 x 0.5 mm^2 (AWG 20) / length 250 mm (9.84 in)

Signal	Terminal of 9-pin sub D socket [C] (encoder end)
A	1
$\overline{A}$	6
B	2
$\overline{B}$	7
C	3
$\overline{C}$	8
UB	9
GND	5

4.12 Connection of interface adapter option UWS21B (RS232)

4.12.1 Part number

Interface adapter UWS21B: 1 820 456 2

4.12.2 Scope of delivery

The scope of delivery for the UWS21B option includes:

- UWS21B
- CD-ROM with MOVITOOLS® MotionStudio
- Serial interface cable with 9-pin sub D socket and 9-pin sub D connector to connect the UWS21B option to the PC.
- Serial interface cable with two RJ10 connectors to connect UWS21B to MOVIDRIVE®.

4.12.3 MOVIDRIVE®-UWS21B connection

- Use the connection cable supplied to connect the UWS21B option to the MOVIDRIVE® unit.
- Plug the connection cable into the XT terminal socket of the MOVIDRIVE® unit.
- Note that the DBG60B keypad and the UWS21B serial interface cannot be connected to the MOVIDRIVE® at the same time.

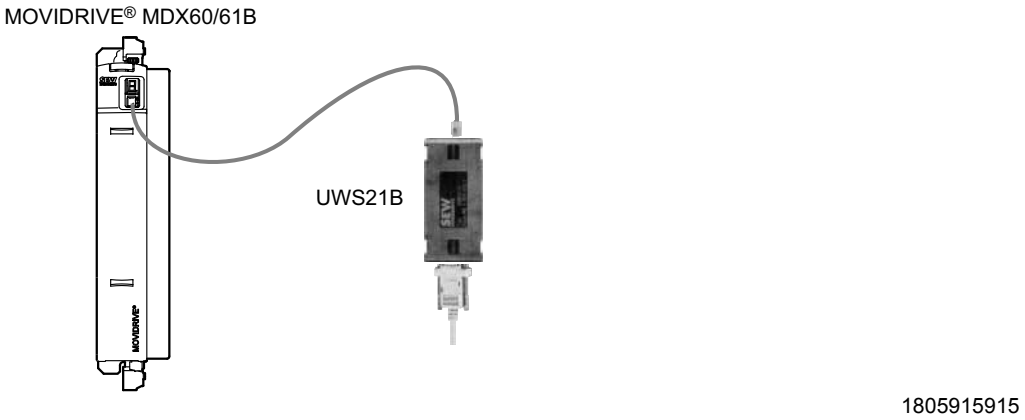


Fig. 6: Connection cable between MOVIDRIVE® and UWS21B

4.12.4 Connecting UWS21B to PC

- Use the connection cable supplied (shielded RS232 standard interface cable) to connect the UWS21B option to the PC.

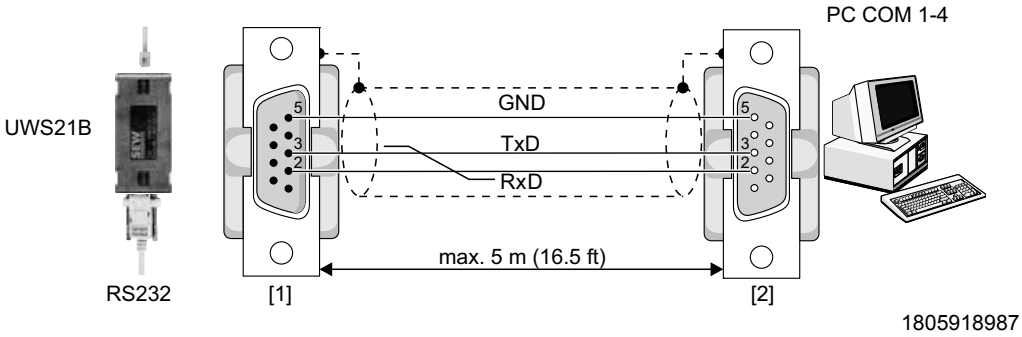


Fig. 7: UWS21B-PC connection cable (1:1 connection)

[1] 9-pin D-sub connector
[2] 9-pin D-sub socket

4.13 Connecting the interface adapter option USB11A

4.13.1 Part number

Interface adapter USB11A: 824 831 1

4.13.2 Scope of delivery

- The scope of delivery for the USB11A includes:
  - USB11A interface adapter
  - USB connection cable PC - USB11A (type USB A-B)
  - Connection cable for MOVIDRIVE® MDX60B/61B - USB11A (cable RJ10-RJ10)
  - CD-ROM with drivers and MOVITOOLS® MotionStudio
- The USB11A interface adapter supports USB 1.1 and USB 2.0.

4.13.3 Connecting MOVIDRIVE®-USB11A - PC

- Use the connection cable [1] (RJ10 - RJ10) supplied to connect the USB11A option to the MOVIDRIVE® unit.
- Plug the connection cable [1] into the XT terminal slot of the MOVIDRIVE® MDX60B/61B and into the RS485 slot of the USB11A.
- Note that the DBG60B keypad and the USB11A interface adapter cannot be connected to MOVIDRIVE® at the same time.
- Use the supplied USB connection cable [2] (type USB A-B) to connect the USB11A to the PC.

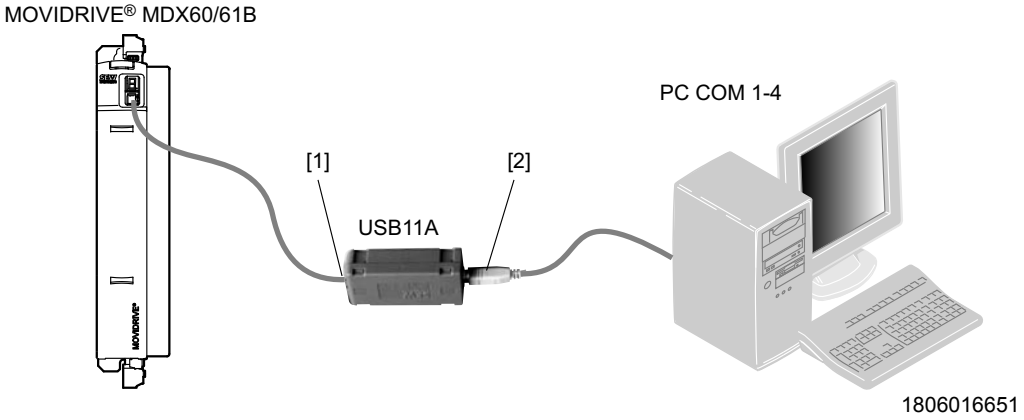


Fig. 8: Connection cable for MOVIDRIVE® MDX60B/61B - USB11A

4.13.4 Installation

- Connect the USB11A to a PC and MOVIDRIVE® MDX60B/61B using the connection cables supplied.
- Insert the enclosed CD into the CD drive of your PC and install the driver. The first free COM port on the PC will be assigned to the USB11A interface adapter.

4.13.5 Operation with MOVITOOLS® MotionStudio

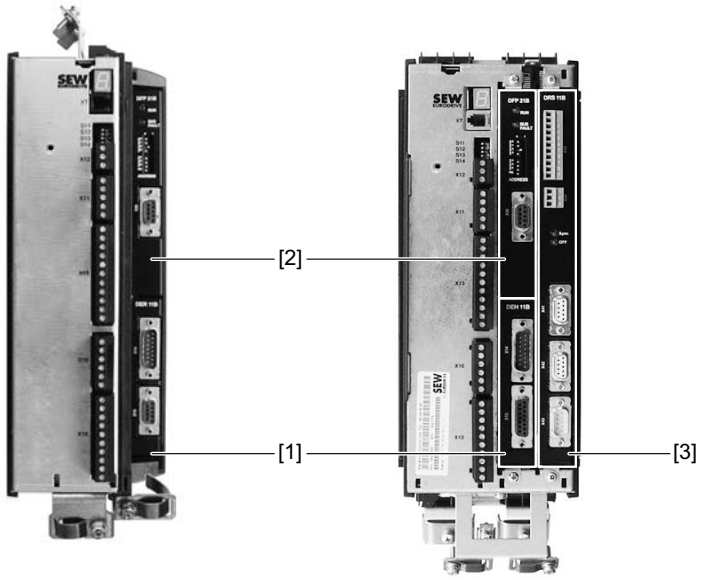
- After installation, the PC recognizes the USB11A interface adapter after approximately 5 to 10 s.
- Start MOVITOOLS® MotionStudio.

	INFORMATION
	If the connection between the PC and USB11A is interrupted, you will have to restart MOVITOOLS® MotionStudio.

4.14 Option combinations for MDX61B

4.14.1 Arrangement of the option slots

Size 0 (0005 ... 0014) Size 1 ... 6 (0015 ... 1320)



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[1] Encoder slot for encoder options
[2] Fieldbus slot for communication options
[3] Expansion slot for communication options (only sizes 1 to 6)

4.14.2 Option card combinations for MDX61B

The option cards are different sizes and can only be installed in the matching option slots. The following list shows the possible combinations of option cards for MOVIDRIVE® MDX61B.

Option card	Designation	MOVIDRIVE® MDX61B		
		Encoder slot Size 0 - size 7	Fieldbus port Size 0 - size 7	Expansion slot Size 1 - size 7
DEH11B	Encoder input incr. / HIPERFACE®	X		
DEH21B	Encoder input absolute encoder	X		
DEU21B	Encoder input absolute encoder	X		
DER11B	Encoder input resolver/HIPERFACE®	X		
DFP21B	PROFIBUS fieldbus interface		X	
DFI11B	INTERBUS fieldbus interface		X	
DFI21B	Fieldbus interface INTERBUS LWL		X	
DFD11B	Fieldbus interface DeviceNet		X	
DFC11B	CAN/CANopen fieldbus interface		X	
DFE11B DFE12B DFE13B	Ethernet fieldbus interface		X	
DFE32B	PROFINET IO fieldbus interface		X	
DFE33B	EtherNet/IP fieldbus interface		X	
DFE24B	EtherCAT fieldbus interface		X	
DFS11B	PROFIBUS fieldbus interface with PROFIsafe (safe stop)		X	
DFS12B	PROFIBUS fieldbus interface with PROFIsafe		X	
DFS21B	PROFINET IO fieldbus Interface with PROFIsafe (Safe Stop)		X	
DCS21B/ 31B	Safety monitor			X
DIO11B	I/O expansion		X	X[1)]
DRS11B	Phase-synchronous operation			X
DIP11B	SSI encoder interface			X
DHP11B	User-programmable MOVI-PLC® *basic* controller		X	
DHE41B	User-programmable MOVI-PLC® *advanced* controller		X	X[1)]
DHF41B	User-programmable MOVI-PLC® *advanced* controller			X
DHR41B	User-programmable MOVI-PLC® *advanced* controller			X
DHP11B + OST11B	DHP11B + OST11B (RS485 interface, only in combination with DHP11B)	OST11B	DHP11B	DHP11B + OST11B[2)]

1) When fieldbus slot is not available

2) When encoder slot is not available

4.15 Installing and removing option cards

	INFORMATION
	• For MOVIDRIVE® **MDX61B size 0**, **only SEW-EURODRIVE** is authorized to install or remove option cards. • For MOVIDRIVE® MDX61B sizes 1 to 7, you can install or remove the option cards yourself.

4.15.1 Before you start

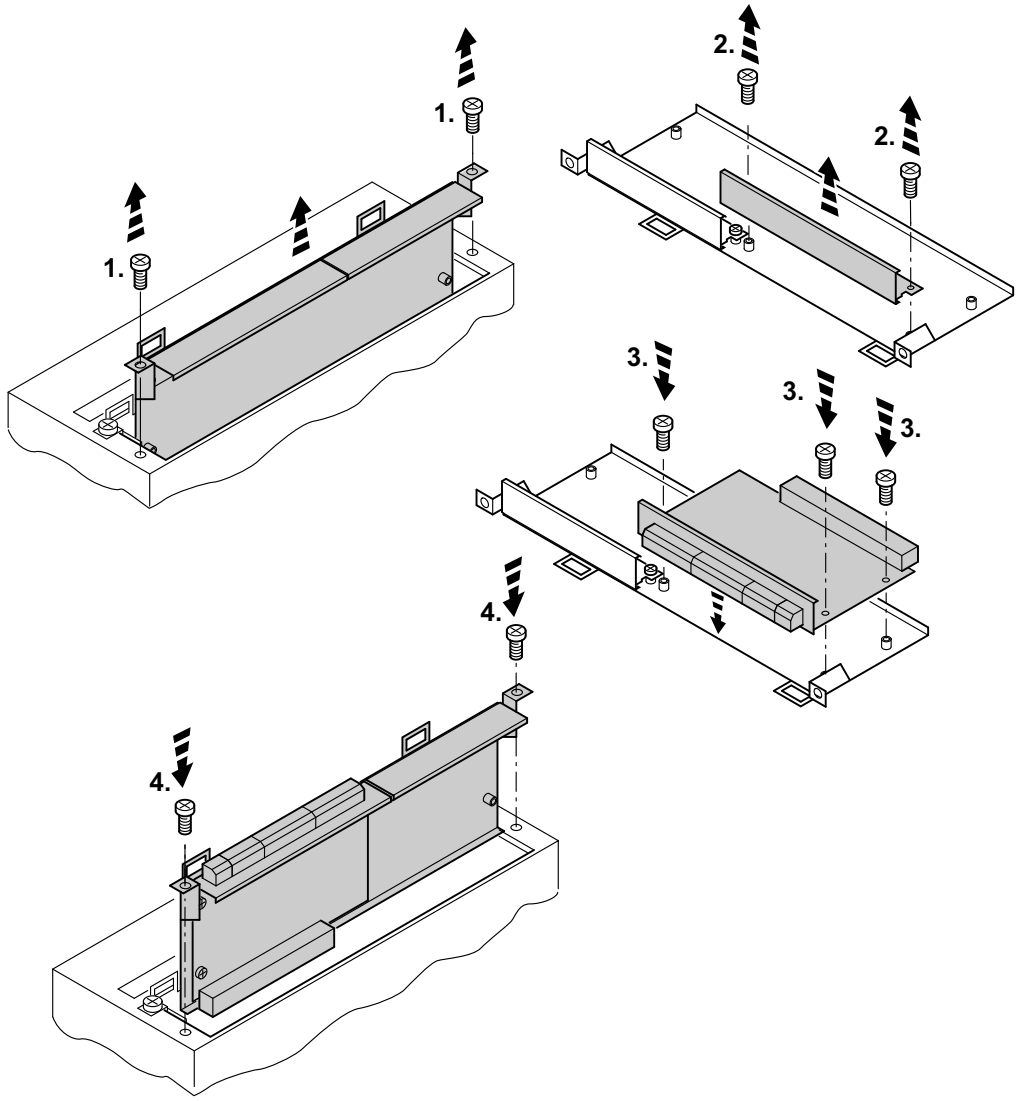
Observe the following notes before installing or removing an option card:

	NOTICE
	Electrostatic charge. Damage to electronic components. • Disconnect the inverter from the power. Switch off the DC 24 V and the supply system voltage. • Take appropriate measures to protect the option card from electrostatic charge (use discharge strap, conductive shoes, etc.) before touching it.

- **Before installing the option card**, remove the keypad (→ Sec. "Removing/installing the keypad") and the front cover (→ Sec. "Removing/installing the front cover").
- **After having installed the option card**, replace the keypad (→ Sec. "Removing/installing the keypad") and the front cover (→ Sec. "Removing/installing the front cover").
- Keep the option card in its original packaging until immediately before you are ready to install it.
- Hold the option card by its edges only. Do not touch any of the components.

4.15.2 Basic procedure for installing/removing an option card

The following figure shows the basic procedure for installing an option card in MOVIDRIVE® MDX61B size 1 - 7



1. Remove the retaining screws holding the card retaining bracket. Pull the card retaining bracket out evenly from the slot (do not twist!).
2. Remove the retaining screws of the black cover plate on the card retaining bracket. Remove the black cover plate.
3. Position the option card onto the retaining bracket so that the retaining screws fit into the corresponding bores on the card retaining bracket.
4. Insert the retaining bracket with the installed option card into the slot, pressing slightly so it is seated properly. Secure the card retaining bracket with the retaining screws.
5. To remove the option card, follow the instructions in reverse order.

4.16 Connecting encoders and resolvers

	INFORMATION
	• The wiring diagrams do not show the view onto the cable end but the connection to the motor or MOVIDRIVE®. • The conductor colors specified in the wiring diagrams are in accordance with IEC 757 and correspond to the conductor colors used in the pre-fabricated cables from SEW.

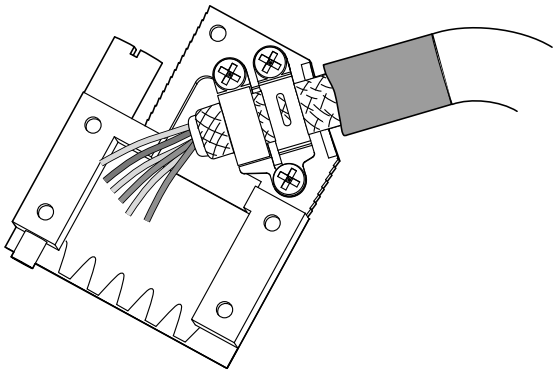
4.16.1 General installation notes

- The D-sub connectors shown in the wiring diagrams have a 4/40 UNC thread.
- Max. line length inverter – encoder/resolver: 100 m (328 ft) with a capacitance per unit length ≤ 120 nF/km.
- Cable cross section: 0.20 – 0.5 mm^2 (AWG 24 ... 20)
- If you cut a core of the encoder/resolver cable, insulate the cut-off end of the core.
- Use shielded cables with twisted pair conductors and make sure they are grounded on both ends over a large surface area:
  - At the encoder in the cable gland or in the encoder plug
  - At the inverter in the housing of the D-sub plug
- Route the encoder/resolver cable separately from the power cables.

4.16.2 Connecting the shield

Connect the shield of the encoder/resolver cable over a large area.

On the inverter Connect the shield on the inverter end in the housing of the sub D connector (→ following figure).



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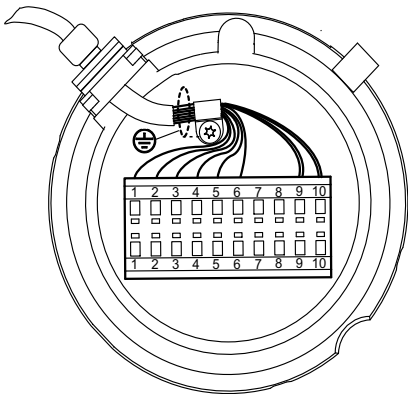
On the encoder/ resolver

Connect the shield on the encoder/resolver side at the respective grounding clamps (→ following figure). When using an EMC screw fitting, apply the shield over a wide area in the cable gland. For drives with a plug connector, connect the shield on the encoder plug.



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4.16.3 Prefabricated cables

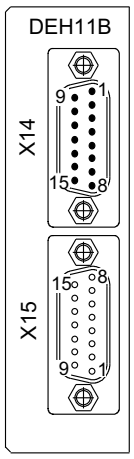
SEW-EURODRIVE offers pre-fabricated cables for connecting encoders/resolvers. We recommend using these prefabricated cables.

4.17 Connection and terminal description of the DEH11B (HIPERFACE®) option

4.17.1 Part number

HIPERFACE® encoder card type DEH11B option: 824 310 7

	INFORMATION
	• The "HIPERFACE® encoder card type DEH11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B. • The DEH11B option must be plugged into the encoder slot.

Front view of DEH11B	Description	Terminal	Function
 1806062475	**X14: Input for external encoder or output for incremental encoder simulation** **Pulse count of the incremental encoder simulation:** • 1024 pulses/revolution with HIPERFACE® encoder on X15 • As at X15: Motor encoder input with sin/cos encoder or TTL sensor on X15	**X14:1** **X14:2** **X14:3** **X14:4** **X14:5/6** **X14:7** **X14:8** **X14:9** **X14:10** **X14:11** **X14:12** **X14:13/14** **X14:15**	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) DATA+ Reserved Switchover Reference potential DGND (COS–) Signal track $\overline{A}$ ($\overline{K1}$) (SIN–) Signal track $\overline{B}$ ($\overline{K2}$) Signal track $\overline{C}$ ($\overline{K0}$) DATA- Reserved DC+12 V (tolerance range DC 10.5 – 13 V) (max. load X14:15 **and** X15:15 = DC 650 mA)
	X15: Motor encoder input	**X15:1** **X15:2** **X15:3** **X15:4** **X15:5** **X15:6** **X15:7** **X15:8** **X15:9** **X15:10** **X15:11** **X15:12** **X15:13** **X15:14** **X15:15**	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) DATA+ Reserved Reference potential TF/TH/KTY– Reserved Reference potential DGND (COS–) Signal track $\overline{A}$ ($\overline{K1}$) (SIN–) Signal track $\overline{B}$ ($\overline{K2}$) Signal track $\overline{C}$ ($\overline{K0}$) DATA- Reserved TF/TH/KTY+ connection DC+12 V (tolerance range DC 10.5 – 13 V) (max. load X14:15 **and** X15:15 = DC 650 mA)

	INFORMATION
	• If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8). • The DC 12 V supply voltage from X14 and X15 is sufficient to operate SEW encoders (except HTL encoders) with a DC 24 V supply voltage. With all other encoders, check whether they can be connected to the DC 12 V supply voltage.

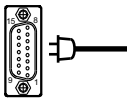
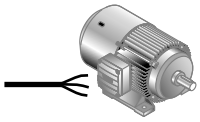
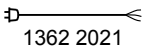
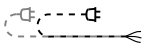
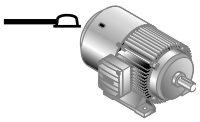
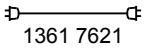
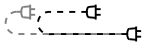
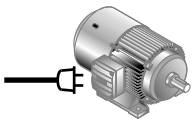
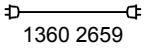
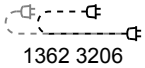
	NOTICE
	Do not connect HTL encoders E..C to X15 of option DEH11B. Doing so can destroy the X15 (motor encoder input) on the DEH11B option. Only connect HTL encoders E..C to option DEH11B/12B using the interface adapter DWE11B/12B (→ Sec. "Connecting the interface adapter type DWE11B/12B").

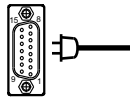
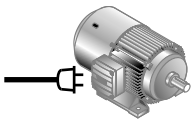
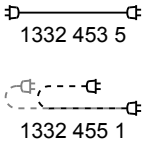
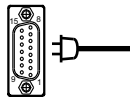
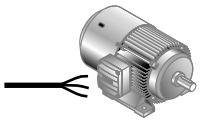
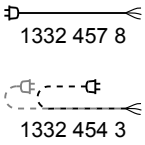
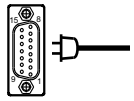
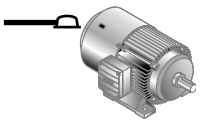
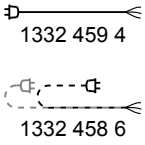
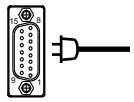
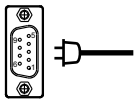
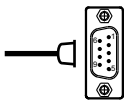
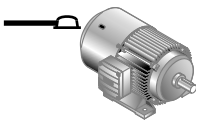
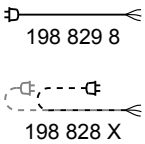
4.17.2 Permissible encoders at X:14

Refer to section "Connecting external encoders to X:14" (page 92).

4.17.3 Permissible encoders at X:15

The following SEW encoders can be connected to the option HIPERFACE® encoder card type DEH11B:

Encoder on DR series AC motors – MOVIDRIVE®					
Motor type	**Encoder**	**MOVIDRIVE® inverter**	**Motor**	**Cable**	**Details**
DR71 – DR132	ES7S ES7R AS7W	X15 		 1362 2021  1362 2048	(page 93)
DR160 – DR225	EG7S EG7R AG7W				
DR71 – DR132	ES7S ES7R AS7W			 1361 7621  1361 7648	
DR160 – DR225	EG7S EG7R AG7W				
DR315	EH7S			 1360 2659  1362 3206	

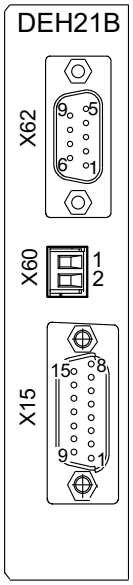
Encoders on DT../DV.. and CM series motors – MOVIDRIVE®					
Motor type	**Encoder**	**MOVIDRIVE® inverter**	**Motor**	**Cable**	**Details**
DT../DV.., DS56 CT../CV.., CM71 – 112 CMP	AS1H ES1H AK0H EK0H AV1H AF1H EG7C			 1332 453 5 1332 455 1	(page 93)
CM71 – 112	AS1H ES1H AV1H AF1H EG7C			 1332 457 8 1332 454 3	
DT../DV.., CT../CV.., EH1S ES1S ES2S EV1S ES1R ES2R EV1R: EH1R				 1332 459 4 1332 458 6	
DT../DV..,	ES1T ES2T EV1T EH1T	X15:  DWI11A X2: 	DWI11A X1:  	 198 829 8 198 828 X 817 957 3	

4.18 Connection and terminal description of the DEH21B option

4.18.1 Part number

Encoder card option DEH21B: 1820 818 5

	INFORMATION
	• For detailed information on the DEH21B option, refer to the "MOVIDRIVE® MDX61B DIP11B/DEH21B absolute encoder cards". • The DEH21B option card can be installed in MOVIDRIVE® MDX61B sizes 0 to 7. Only SEW-EURODRIVE staff may install or remove the DEH21B option for MOVIDRIVE® MDX61B size 0. • The DEH21B option card must be plugged into the encoder slot. • The DC 24 V power supply of an encoder connected to X62 is ensured when X60 is supplied with DC 24 V. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual.

Front view of DEH21B	Description	Terminal	Function
 1806096139	**X62: Absolute encoder connection**	**X62:1** **X62:2** **X62:3** **X62:4** **X62:5** **X62:6** **X62:7** **X62:8** **X62:9**	Data + Reserved Cycle + Reserved DGND Data – Reserved Pulse – DC 24 V output
	X60: Voltage supply	**X60:1** **X60:2**	24VIN DGND
	X15: Motor encoder input	**X15:1** **X15:2** **X15:3** **X15:4** **X15:5** **X15:6** **X15:7** **X15:8** **X15:9** **X15:10** **X15:11** **X15:12** **X15:13** **X15:14** **X15:15**	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) DATA+ Reserved Reference potential TF/TH/KTY– Reserved Reference potential DGND (COS–) Signal track $\overline{A}$ ($\overline{K1}$) (SIN–) Signal track $\overline{B}$ ($\overline{K2}$) Signal track $\overline{C}$ ($\overline{K0}$) DATA- Reserved TF/TH/KTY+ connection DC+12 V (tolerance range DC 10.5 – 13 V) (max. load X15:15 = DC 650 mA)

	INFORMATION
	The DC 12 V supply voltage from X15 is sufficient to operate SEW encoders (except HTL encoders) with a DC 24 V supply voltage. With all other encoders, check whether they can be connected to the DC 12 V supply voltage.

	NOTICE
	Do not connect HTL encoders E..C to X15 of the DEH21B option. Doing so can destroy the X15 (motor encoder input) of the DEH21B option. Only connect HTL encoders E..C to option DEH21B using the interface adapter DWE11B/12B (→ Sec. "Connecting the interface adapter type DWE11B/12B").

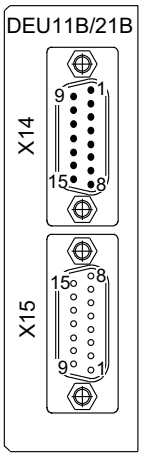
4.19 Connection and terminal description of the DEU21B option

4.19.1 Part number

Multi-encoder card option type DEU21B: 18221696

INFORMATION

- For detailed information on the DEU21B option, refer to the "MOVIDRIVE® MDX61B multi-encoder card DEU21B" manual.
- The DEU21B option card can be installed in MOVIDRIVE® MDX61B sizes 0 to 7. Only SEW-EURODRIVE staff may install or remove the DEU21B option for MOVIDRIVE® MDX61B size 0.
- The DEU21B option card must be plugged into the encoder slot.
- The DC 24 V power supply of an encoder connected to X62 is ensured when X60 is supplied with DC 24 V. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual.

Front view of DEU11B/21B	Description	Terminal	Function
	**X14: Input for external encoder or output for incremental encoder simulation** **Output for incremental encoder simulation:** • Signal level to RS422 • The number of pulses is the same as on X15 motor encoder input	**X14:1**	(COS+) signal track A (K1)
		X14:2	(SIN+) signal track B (K2)
		X14:3	Signal track C (K0) / pulse +
		X14:4	DATA+ CANHigh
		X14:5/6	Reserved
		X14:7	Switchover
		X14:8	Reference potential DGND
		X14:9	(COS–) Signal track $\overline{A}$ ($\overline{K1}$)
		X14:10	(SIN–) Signal track $\overline{B}$ ($\overline{K2}$)
		X14:11	Signal track $\overline{C}$ ($\overline{K0}$) / pulse –
		X14:12	DATA- CANLow
		X14:13	DC 24 V encoder supply[1)]
		X14:14	Reserved[1)]
		X14:15	DC 12 V encoder power supply[1)]
	X15: Motor encoder input	**X15:1**	(COS+) signal track A (K1)
		X15:2	(SIN+) signal track B (K2)
		X15:3	Signal track C (K0) / pulse +
		X15:4	DATA+
		X15:5	Reserved
		X15:6	Reference potential TF/TH/KTY–
		X15:7	Reserved
		X15:8	Reference potential DGND
		X15:9	(COS–) Signal track $\overline{A}$ ($\overline{K1}$)
		X15:10	(SIN–) Signal track $\overline{B}$ ($\overline{K2}$)
		X15:11	Signal track $\overline{C}$ ($\overline{K0}$) / pulse –
		X15:12	DATA-
		X15:13	DC 24 V encoder supply[1)]
		X15:14	TF/TH/KTY+ connection
		X15:15	DC 24 V (tolerance range DC 10.5 - 13 V)[1)]

1) The maximum load on X14:13 and X15:13 is DC 650 mA in total. If the overall unit load on the 24 V level exceeds 400 mA, you must connect an external DC 24 V supply to X10:9/X10:10. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual.

	NOTICE
	The connections on X14 and X15 must not be installed or removed during operation. Electrical components in the encoder or on the encoder card could be destroyed. De-energize the inverter before plugging or removing the encoder connections. Switch off the supply voltage and the DC 24 V (X10:9).

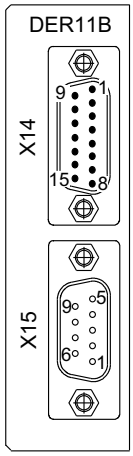
	INFORMATION
	• If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8). • The 24 V encoders from SEW (except HTL and Hiperface®) have a wide voltage range (DC 10 V – 30 V) and can be supplied alternatively with DC 24 V (PIN13) or DC 12 V (PIN15).

4.20 Connection and terminal description of the DER11B (resolver) option

4.20.1 Part number

Resolver card option type DER11B: 824 307 7

	INFORMATION
	• The "Resolver card type DER11B" option can only be used with MOVIDRIVE® MDX61B, not with MDX60B. • The DER11B option must be plugged into the encoder slot.

Front view of DER11B	Description	Terminal	Function
 1806100363	**X14: Input for external encoder or output for incremental encoder simulation** **The pulse count of the incremental encoder simulation is always 1024 pulses per revolution**	**X14:1** **X14:2** **X14:3** **X14:4** **X14:5/6** **X14:7** **X14:8** **X14:9** **X14:10** **X14:11** **X14:12** **X14:13/14** **X14:15**	(cos) signal track A (K1) (sin) signal track B (K2) Signal track C (K0) DATA+ Reserved Switchover Reference potential DGND (cos–) signal track $\overline{A}$ ($\overline{K1}$) (sin–) signal track $\overline{B}$ ($\overline{K2}$) Signal track $\overline{C}$ ($\overline{K0}$) DATA- Reserved DC+12 V (tolerance range DC 10.5 – 13 V) (max. load DC 650 mA)
	X15: Resolver input	**X15:1** **X15:2** **X15:3** **X15:4** **X15:5** **X15:6** **X15:7** **X15:8** **X15:9**	sin+ (S2) cos+ (S1) Ref.+ (R1) N.C. Reference potential TF/TH/KTY– sin– (S4) cos– (S3) Ref.– (R2) TF/TH/KTY+ connection

	INFORMATION
	• If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8). • The DC 12 V supply voltage from X14 is sufficient to operate SEW encoders (except HTL encoders) with a DC 24 V supply voltage. With all other encoders, check whether they can be connected to the DC 12 V supply voltage.

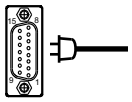
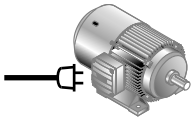
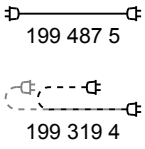
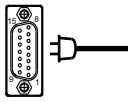
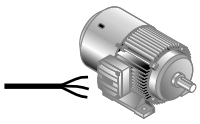
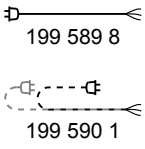
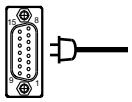
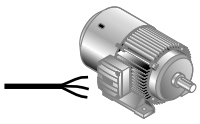
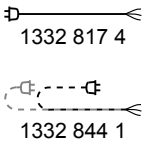
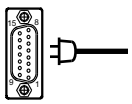
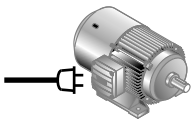
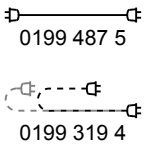
4.20.2 Permissible encoders at X:14

Refer to section "Connecting external encoders to X:14" (page 92).

4.20.3 Resolver at X:15

2-pole resolvers, AC 7 V, 7 kHz, can be connected at X15 (resolver input). The gear ratio of the resolver amplitudes must be approximately 0.5 ± 10%. The control dynamics decrease if the value is lower; the evaluation may be unstable if the value is higher.

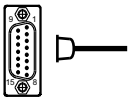
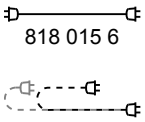
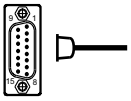
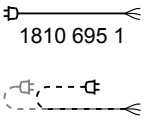
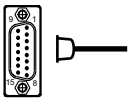
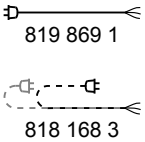
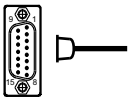
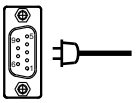
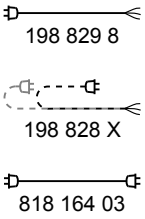
SEW-EURODRIVE offers the following prefabricated cables for connecting resolvers to DER11B:

Encoders on DT../DV.. and CM series motors – MOVIDRIVE®					
Motor type	**Encoder**	**MOVIDRIVE® inverter**	**Motor**	**Cable**	**Details**
DS56 CM71..112	Resolver			 199 487 5 199 319 4	(page 96)
CM71 – 112	Resolver			 199 589 8 199 590 1	
DS56	Resolver			 1332 817 4 1332 844 1	
CMP	Resolver			 0199 487 5 0199 319 4	

4.21 Connecting external encoders to X:14

4.21.1 External encoder at DEH11B and DER11B (X:14)

The following external encoders can be connected to connector X14 of the DEH11B option and the DER11B option.

External encoder at DEH11B and DER11B - MOVIDRIVE® (X:14)			
Encoder	**MOVIDRIVE® inverter**	**Cable**	**Details**
AS1H ES1H AV1H			(page 97)
AS1H ES1H AV1H			
EH1S ES1S ES2S EV1S ES1R ES2R EV1R: EH1R			
ES1T ES2T EV1T EH1T	 DWI11A X2: 		

4.22 Connection of encoder options

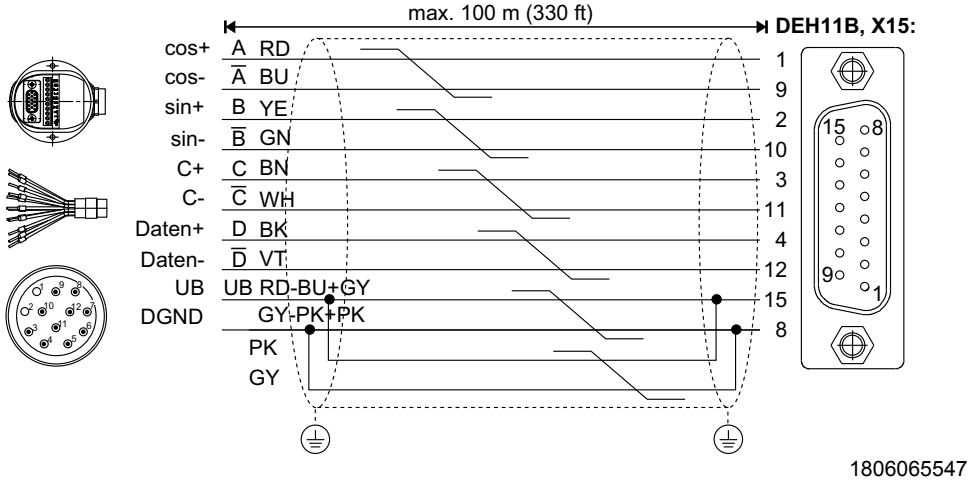
4.22.1 Connection of DEH11B option

Encoder connection at X:15

Depending on the motor type and motor configuration, the encoder is connected via plug connector or terminal box.

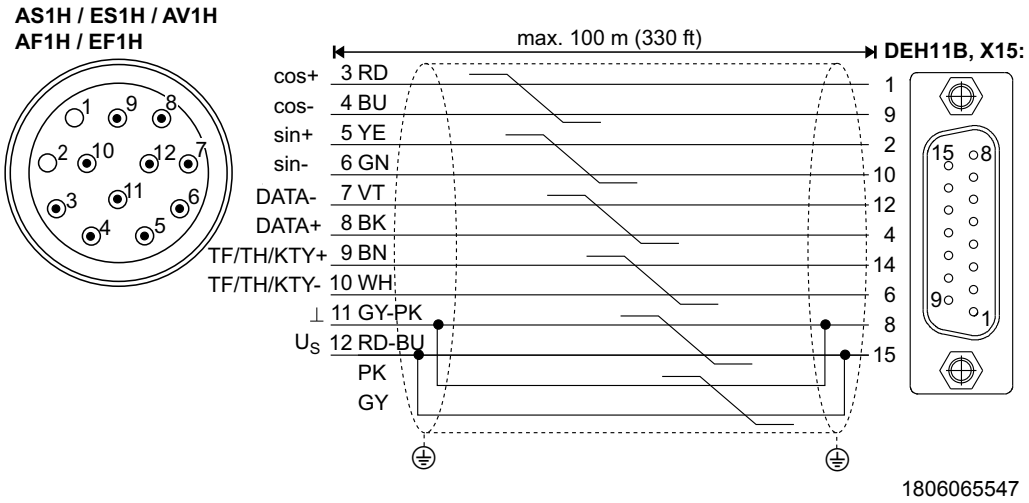
DR71...315

Connect the encoder to the option DEH11B as follows:



DT../DV.., DS56, CT../CV., CM71...112/CMP with plug connector

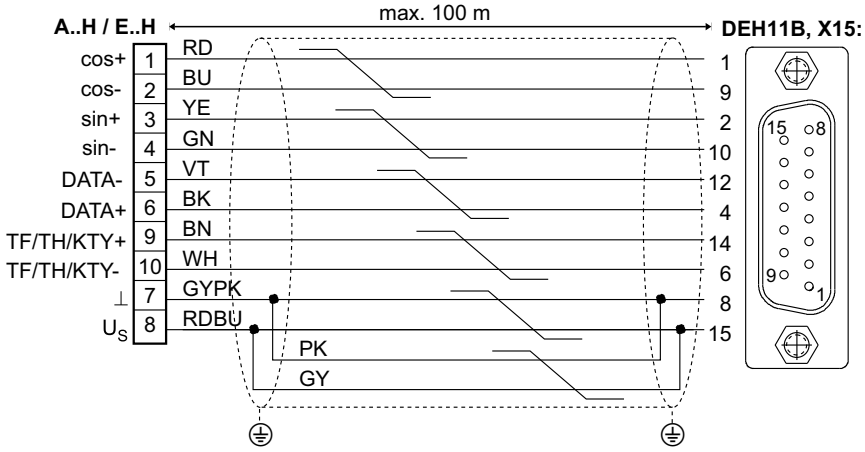
Connect the HIPERFACE® encoder to the option DEH11B as follows:



	INFORMATION
	Important for DT/DV or CT/CV motors: TF or TH is **not** connected with the encoder cable but must be connected using an additional 2-core shielded cable.

CM71...112 with terminal box

Connect the HIPERFACE® encoder to the option DEH11B as follows:



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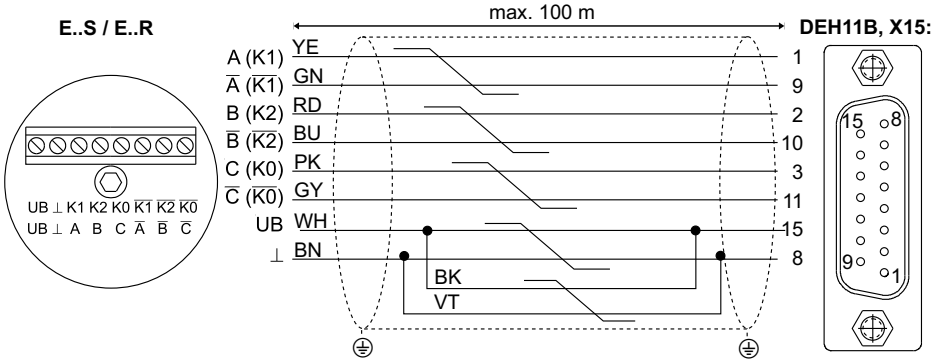
Connecting sin/cos and TTL encoders (DC 24 V) to DT../ DV.., CT../CV.. motors

The high resolution sin/cos encoders and TTL encoders with DC 24 V supply can also be connected to DEH11B. Proceed as follows to connect sin/cos encoders and TTL encoders with DC 24 V supply to the DEH11B option:



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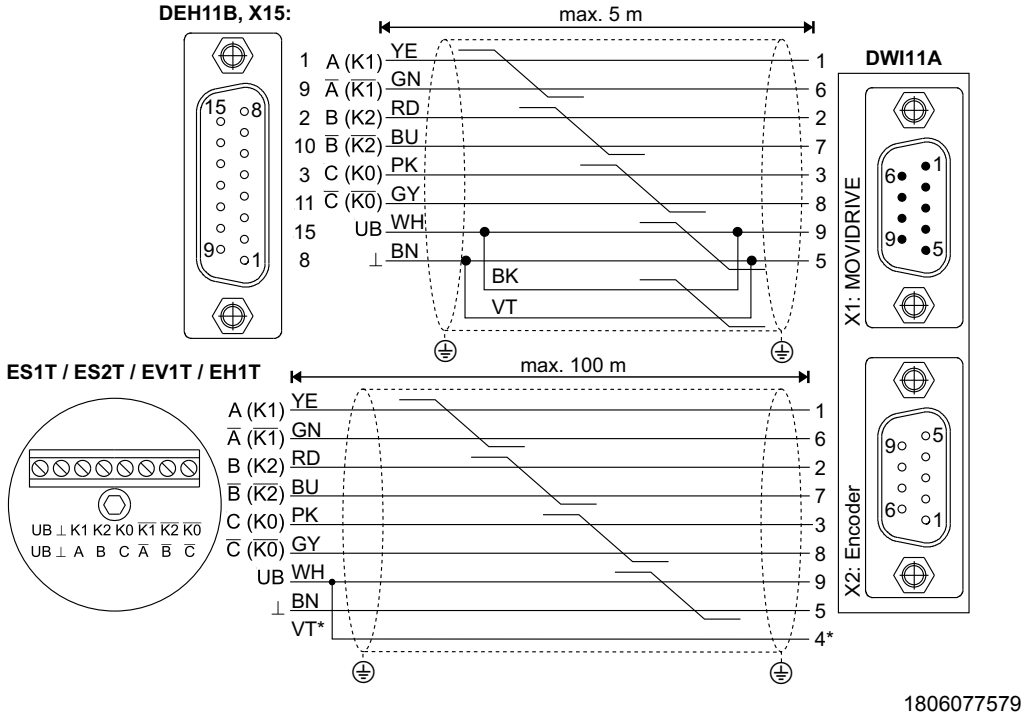
Connecting TTL encoders (DC 5 V) to DT../DV.. motors

Connect the TTL encoders with a DC 5 V voltage supply via the "DC 5 V encoder power supply type DWI11A" option (part number 822 759 4). The sensor cable must also be connected to correct the supply voltage of the encoder. Connect this encoder as follows:



* Connect the sensor cable (VT) on the encoder to UB, do not jumper on the DWI11A!

4.22.2 Connection of DER11B (resolver) option to X:15

Terminal/pin assignment

CM motors: The resolver connections are accommodated in a plug connector or on the 10-pin Wago terminal strip.

DS Motors: The resolver connections in the terminal box are either located on a 10-pin Phoenix terminal strip or in the plug connector.

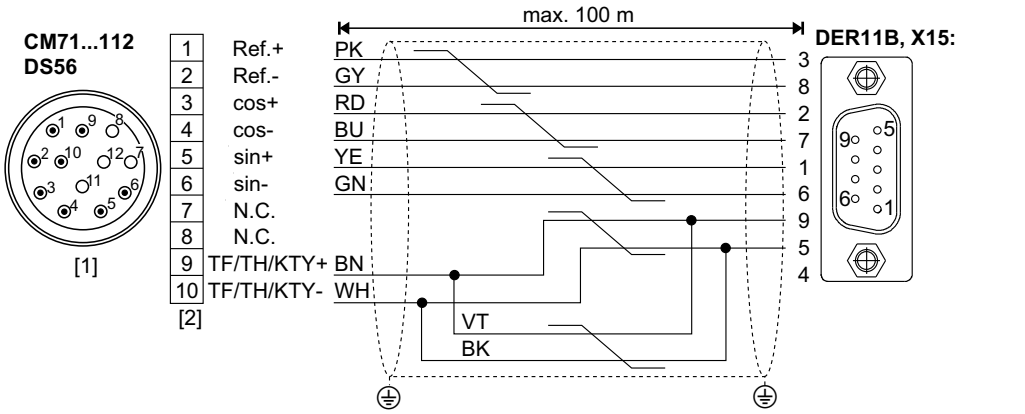
CM plug connector DS56: Intercontec, type ASTA021NN00 10 000 5 000

Terminal / pin	Description		Core color in prefabricated cable
1	Ref.+	Reference	Pink (PK)
2	Ref.-		Gray (GY)
3	cos +	Cosine signal	Red (RD)
4	cos-		Blue (BU)
5	sin+	Sine signal	Yellow (YE)
6	sin-		Green (GN)
9	TF/TH/KTY+	Motor protection	Brown (BN) / violet (VT)
10	TF/TH/KTY–		White (WH) / black (BK)

The resolver signals have the same numbering on the 10-pin Phoenix terminal strip and in the plug connectors.

Connection

Connect the resolver as follows:



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[1] Plug connectors
[2] Terminal strip

4.22.3 Connection of external encoders to the DEH11B and DER11B options

Voltage supply

SEW encoders with DC 24 V voltage supply (max. DC 180 mA) are connected directly to X14. . These SEW encoders are then powered by the inverter.

SEW encoders with a DC 5 V voltage supply must be connected via the "DC 5 V encoder power supply type DWI11A" option (part number 822 759 4).

HIPERFACE® encoder connection

Connect the HIPERFACE® encoder AV1H as follows:

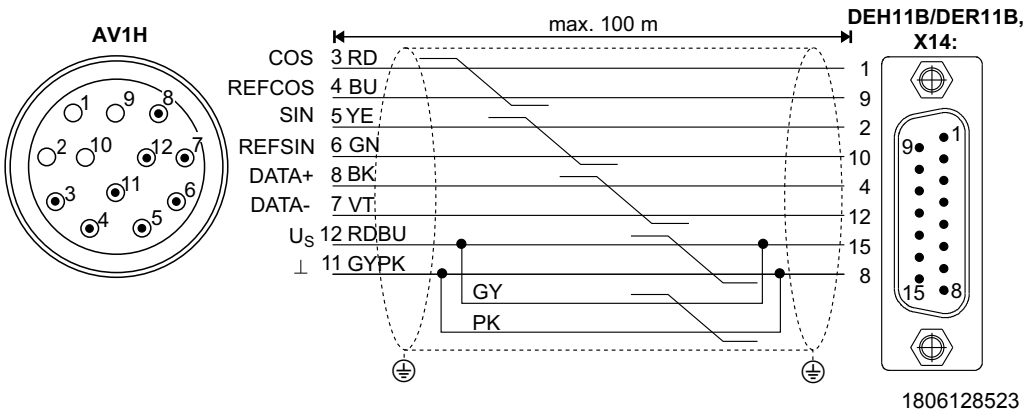


Fig. 12: Connecting the HIPERFACE® encoder AV1H to DEH11B/DER11B as external encoder

You may still connect HIPERFACE® encoders via a prefabricated cable with conductor end sleeves.

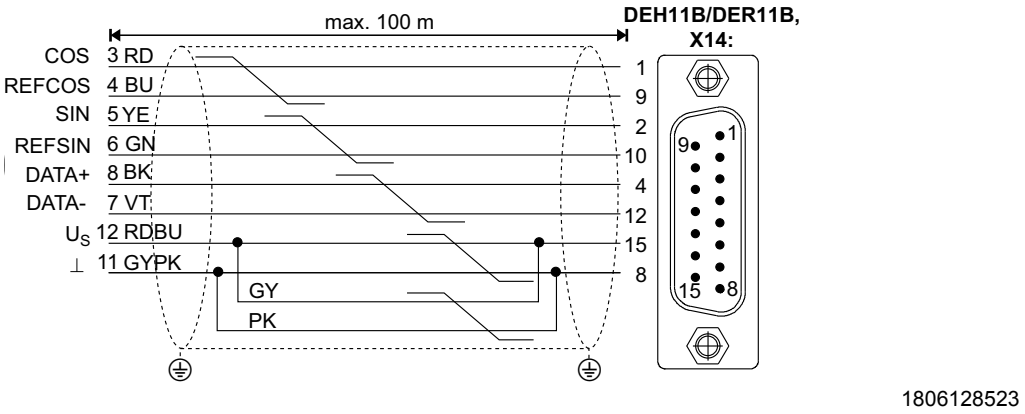


Fig. 13: Connecting the HIPERFACE® encoder AV1H to DEH11B/DER11B as external encoder

Connection of sin/cos and TTL encoders (DC 24 V)

Proceed as follows to connect sin/cos encoders and TTL encoders with DC 24 V supply:

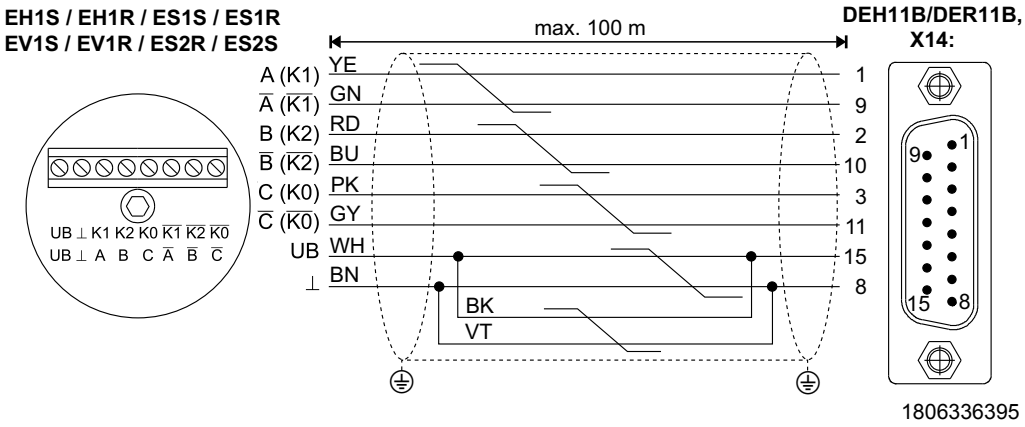


Figure 14: Connecting the sin/cos encoder to DEH11B/DER11B as an external encoder

Connection of TTL encoder (DC 5 V)

DC 5 V encoders with a DC 5 V voltage supply EV1T, EH1T, ES1T and ES2T must be connected via the "DC 5 V encoder power supply type DWI11A" option (part number 822 759 4). The sensor cable must also be connected to correct the supply voltage of the encoder. Connect this encoder as follows:

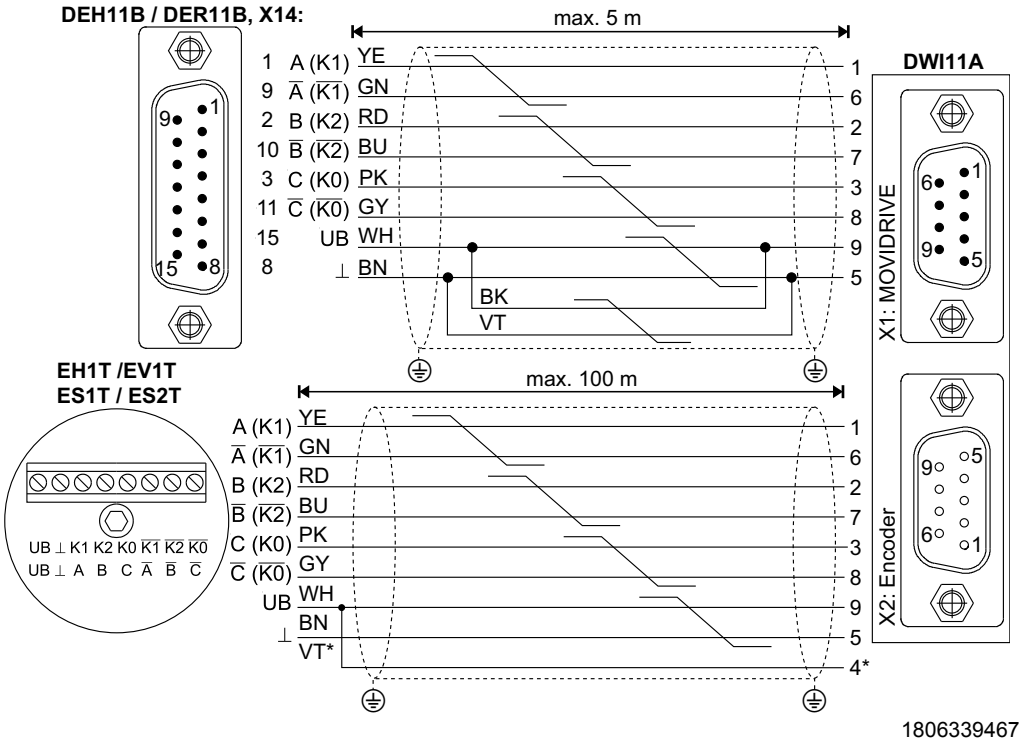


Fig. 15: Connecting the TTL encoder EV1T to MDX via DWI11A as an external encoder

* Connect the sensor cable (VT) on the encoder to UB, do not jumper with DWI11A!

4.23 Connection of incremental encoder simulation

4.23.1 Incremental encoder simulation

Connector X14 of the DEH11B or DER11B option can also be used as the incremental encoder simulation output. For this purpose, you must jumper "switchover" (X14:7) with DGND (X14:8). X14 then delivers the incremental encoder signals with a signal level according to RS422. The number of pulses is:

- With DEH11B as on X15 motor encoder input
- With DER11B 1024 pulses/revolution

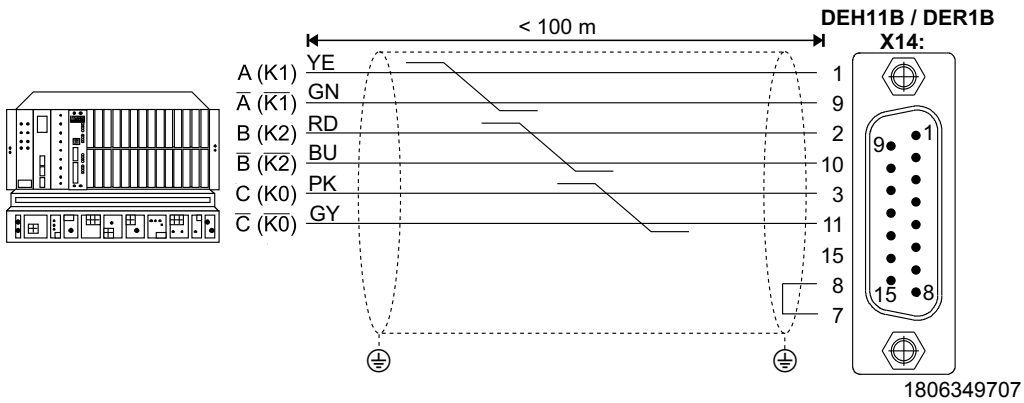


Fig. 16: Incremental encoder simulation connection to DEH11B or DER11B

Part number of the prefabricated cable:

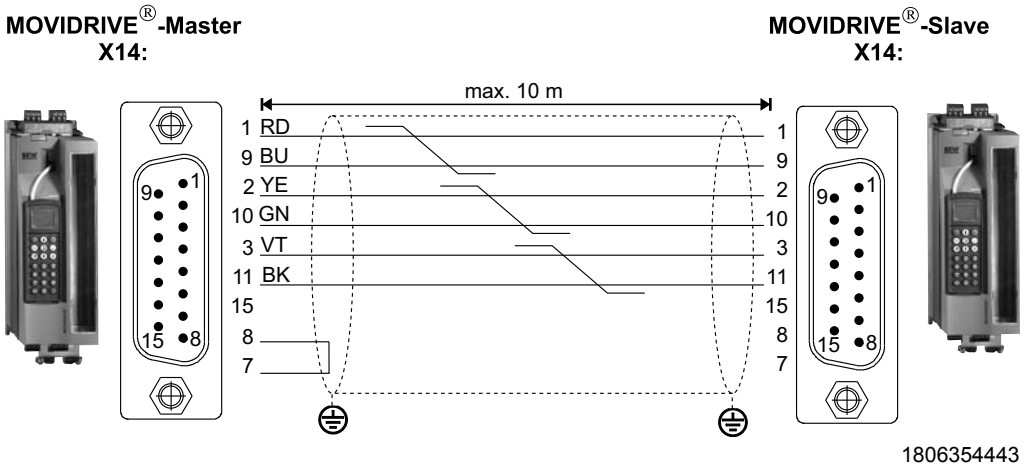
- Option type DEH/DER11B X14: → Incremental encoder simulation
  - For fixed installation: 819 768 7

4.24 Master/slave connection

4.24.1 Master/Slave connection

Connector X14 of the DEH11B or DER11B option can also be used for the "internal synchronous operation" application (master/slave connection of several MOVIDRIVE® units). For this purpose, you must jumper "switchover" (X14:7) with DGND (X14:8) on the master end.

The following figure shows an X14-X14 connection (= master/slave connection) between two MOVIDRIVE® units.



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Part number of the prefabricated cable:

- For fixed installation: 817 958 1

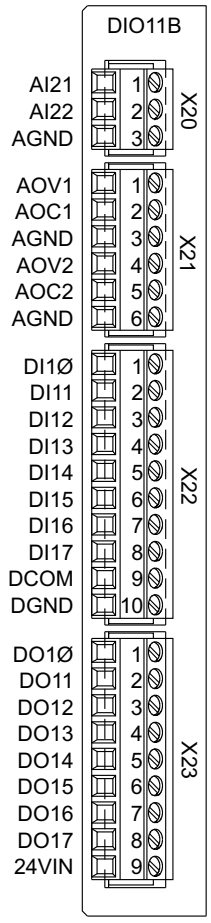
	INFORMATION
	• A **maximum of 3 slaves can be connected to the MOVIDRIVE® master**. • Important: **Do not connect X14:7** when connecting the individual **MOVIDRIVE® slaves together**. Only jumper the connections **X14:7 and X14:8 on the MOVIDRIVE® master**.

4.25 Connection and terminal description of the DIO11B option

4.25.1 Part number

Input/output card type DIO11B: 824 308 5

	INFORMATION
	• The "input/output card type DIO11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B. • The DIO11B option must be plugged into the fieldbus slot. If the fieldbus slot is not available, you can plug the DIO11B input/output card in the expansion slot. • The **extended handle end** of the plug connectors (terminals X20, X21, X22, X23) must **only** be used for **removing the plug connectors** (not for plugging them in!).

Front view of DIO11B	Terminal	Function
	**X20:1/2 AI21/22** **X20:3 AGND**	Setpoint input n2, DC-10 V – 0 – 10 V or DC 0 – 10 V (Differential input or input with AGND reference potential) Reference potential for analog signals (REF1, REF2, A.., AO..)
	X21:1 AOV1 **X21:4 AOV2** **X21:2 AOC1** **X21:5 AOC2** **X21:3/6 AGND**	Analog voltage output V1, factory setting: "actual speed" Analog voltage output V2, factory set to "output current" Load capacity of the analog voltage outputs: I_{max} = DC 10 mA Analog current output C1, factory setting: actual speed Analog current output C2, factory setting: output current P642/645 "Operating mode AO1/2" sets whether the voltage outputs V1/2 (DC 10 V – 0 – 10 V) or the current outputs C1/2 DC (0(4) – 20 mA) are in effect. Selection options for the analog outputs → Parameter menu P640/643 Max. permitted cable length: 10 m / max output voltage: DC 15 V Reference potential for analog signals (REF1, REF2, AI.., AO..)
	X22:1...8 DI1Ø...17 **X22:9 DCOM** **X22:10 DGND**	Binary inputs 1 – 8, factory setting: "No function" The binary inputs are electrically isolated by optocouplers. Selection options for the binary inputs → Parameter menu P61_ Reference potential for the binary inputs DI1Ø – 17 Reference potential for binary signals – Without jumper X22:9-X22:10 (DCOM-DGND) → Isolated binary inputs – With jumper X22:9-X22:10 (DCOM-DGND) → Non-isolated binary inputs
	X23:1...8 DO1Ø...17 **X23:9 24VIN**	Binary outputs 1 – 8, factory setting: "No function" Load capacity of binary outputs: I_{max} = DC 50 mA (short-circuit proof, protected against external voltage to DC 30 V) **Do not apply external voltage to the binary outputs.** Supply voltage DC +24 V for binary outputs D01Ø - D017, non-isolated (reference potential DGND)

4.25.2 Voltage input 24 VIN

The 24VIN (X23:9) voltage input serves as DC+24 V supply voltage for the binary outputs DO1Ø – DO17. Reference potential is DGND (X22:10). The binary outputs do not give a level if the DC+24 V supply voltage is not connected. The supply voltage DC+24 V can also be jumpered from the X10:8 connection of the basic unit if the load does not exceed DC 400 mA (current limitation in X10:8).

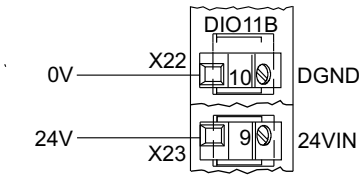


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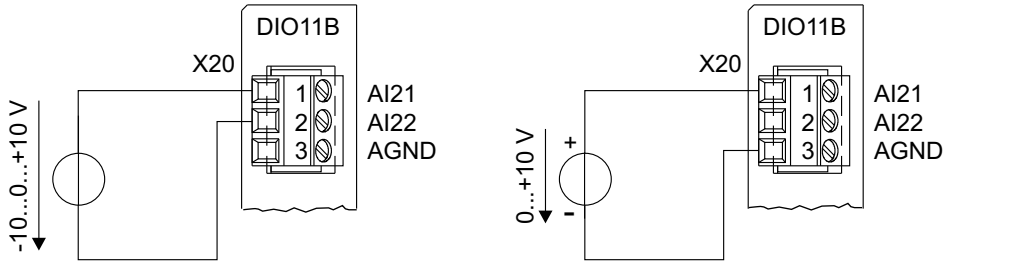
Fig. 17: Voltage input 24VIN (X23:9) and reference potential DGND (X22:10)

4.25.3 Voltage input n2

The analog setpoint input n2 (AI21/22) can be used as a differential input or as an input with AGND reference potential.

Differential input Input with AGND reference potential



1806367883

Fig. 18: Setpoint input n2

4.25.4 Current input n2

You must use an external load if the analog setpoint input n2 (AI21/22) should be used as a current input.

For example R_B = 500 Ω → DC 0 – 20 mA = DC 0 – 10 V

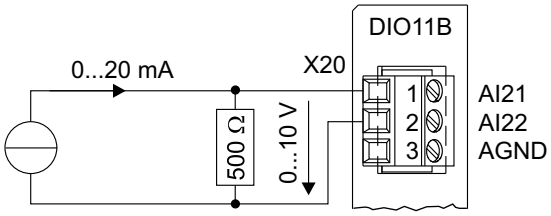


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Fig. 19: Current input with external load

4.25.5 Voltage outputs AOV1 and AOV2

Assign the analog voltage outputs AOV1 and AOV2 in accordance with the following figure:

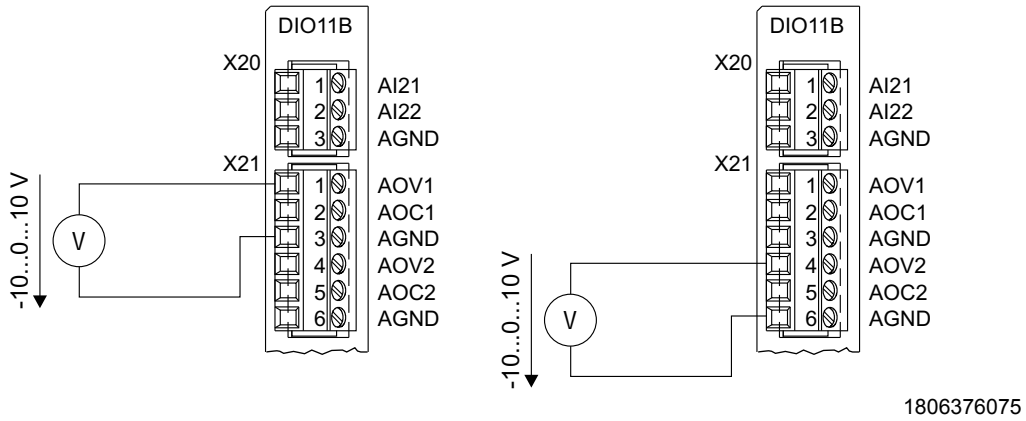


Fig. 20: Voltage outputs AOV1 and AOV2

4.25.6 Current outputs AOC1 and AOC2

Assign the analog current outputs AOC1 and AOC2 in accordance with the following figure:

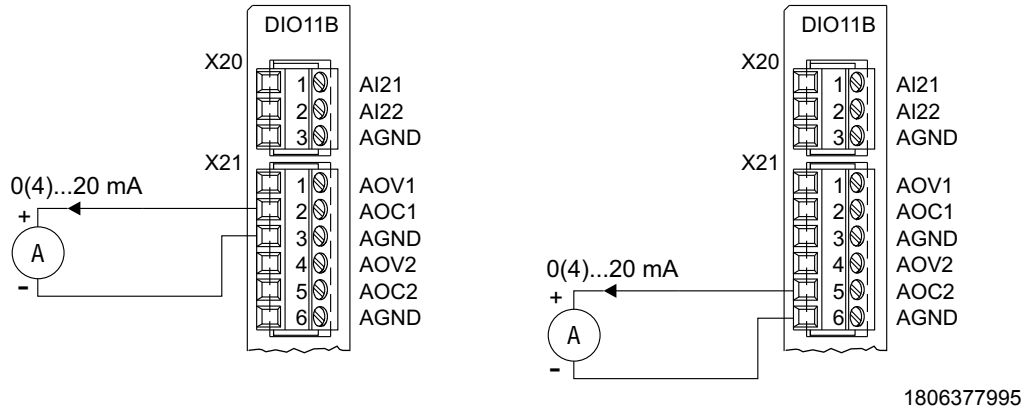


Fig. 21: Current outputs AOV1 and AOV2

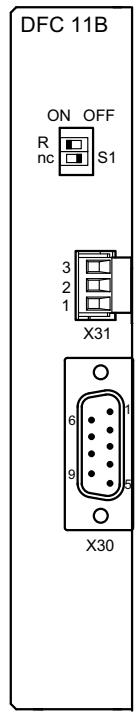
4.26 Connection and terminal description of the DFC11B option

4.26.1 Part number

CAN-Bus interface option type DFC11B: 824 317 4

INFORMATION

- The "CAN bus interface type DFC11B" option can only be used with MOVIDRIVE® MDX61B, not with MDX60B.
- The DFC11B option must be plugged into the fieldbus slot.
- The DFC11B option is powered via MOVIDRIVE® MDX61B. A separate voltage supply is not required.

Front view of DFC11B	Description	DIP switch Terminal	Function
	**DIP switch block S1: Sets the terminating resistor**	**R** **nc**	Terminating resistor for the CAN-Bus cable Reserved
	X31: CAN bus connection	**X31:3** **X31:2** **X31:1**	CAN Low (jumpered with X30:2) CAN High (jumpered with X30:7) DGND CAN[1)]
	X30: CAN bus connection (Sub D9 to CiA standard)	**X30:1** **X30:2** **X30:3** **X30:4** **X30:5** **X30:6** **X30:7** **X30:8** **X30:9**	Reserved CAN Low (jumpered with X31:3) DGND CAN[1)] Reserved Reserved DGND CAN[1)] CAN High (jumpered with X31:2) Reserved Reserved

1) DGND of the CAN-Bus-interface is independent from DGND of the basic unit

4.26.2 Connection MOVIDRIVE® - CAN

The DFC11B option is connected to the CAN bus at X30 or X31 in the same way as the SBus (→ Sec. "System bus connection (SBus 1)") in the basic unit (X12). In contrast to the SBus1, SBus2 is electrically isolated and made available via option DFC11B.

5 Startup

5.1 General startup instructions

⚠ DANGER

Uncovered power connections.

Severe or fatal injuries from electric shock.

- Install the touch guard according to the regulations.
- Never start the unit if the touch guard is not installed.

5.1.1 Requirements

The drive must be configured correctly to ensure that startup is successful. Refer to the MOVIDRIVE® MDX60/61B system manual for detailed project planning notes and an explanation of the parameters.

5.1.2 Parameters of non-SEW motors

The database stores parameters of SEW motors and non-SEW motors. We do not warrant that the parameter data of the non-SEW motors is correct and up to date.

5.1.3 VFC operating modes without speed control

MOVIDRIVE® MDX60/61B inverters are factory set to be taken into operation with the SEW motor which is adapted to the correct power level. The motor can be connected and the drive started immediately in accordance with section "Starting the motor" (→ page 102).

INFORMATION

The startup functions described in this section are used for setting the inverter so it can be adapted optimally to the motor that is connected and to suit the basic conditions.

5.1.4 Inverter/motor combinations

The following tables indicate which inverter/motor combinations this applies to.

400/500 V units

MOVIDRIVE® MDX60/61B in VFC operating mode	SEW motor
0005-5A3-4	DT80K4
0008-5A3-4	DT80N4
0011-5A3-4	DT90S4
0014-5A3-4	DT90L4
0015-5A3-4	DT90L4
0022-5A3-4	DV100M4
0030-5A3-4	DV100L4
0040-5A3-4	DV112M4
0055-5A3-4	DV132S4
0075-5A3-4	DV132M4
0110-5A3-4	DV160M4
0150-503-4	DV160L4
0220-503-4	DV180L4
0300-503-4	DV200L4
0370-503-4	DV225S4
0450-503-4	DV225M4
0550-503-4	DV250M4
0750-503-4	DV280S4
0900-503-4	DV280M4
1100-503-4	D315S4
1320-503-4	D315M4
1600-503-4	DRS315M4
2000-503-4	DRS315L4
2500-503-4	DRS315L4

230 V units

MOVIDRIVE® MDX60/61B in VFC operating mode	SEW motor
0015-2A3-4	DT90L4
0022-2A3-4	DV100M4
0037-2A3-4	DV112M4
0055-2A3-4	DV132S4
0075-2A3-4	DV132M4
0110-203-4	DV160M4
0150-203-4	DV160L4
0220-203-4	DV180L4
0300-203-4	DV200L4

5.1.5 Hoist applications

⚠ DANGER

Risk of fatal injury if the hoist falls.

Severe or fatal injuries.

MOVIDRIVE® MDX60B/61B is not designed for use as a safety device in hoist applications. Use monitoring systems or mechanical protection devices to ensure safety.

5.2 Preliminary work and resources

- Check the installation.

⚠ DANGER

Risk of crushing if the motor starts up unintentionally.

Severe or fatal injuries.

- Ensure that the motor cannot start inadvertently, for example, by removing the electronics terminal block X13.
- Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.

- Performing **startup with the DBG60B keypad**:

  Plug the connector of the DBG60B keypad into the XT slot.

- For **startup with PC and MOVITOOLS® MotionStudio:**

  Plug an interface adapter (e.g. USB11A) into the XT slot and connect it to the PC with an interface cable (RS232). Install and start MOVITOOLS® MotionStudio on your PC.

- Switch on the supply voltage and, if necessary, the DC 24 V supply.
- Check that the default parameter settings are correct (e.g. factory setting).
- Check the set terminal assignment (→ P60_ / P61_).

INFORMATION

A group of **parameter values is changed automatically** at startup. The parameter description P700 "Operating modes" explains which parameters are affected by this step. For the **parameter description**, refer to the MOVIDRIVE® MDX60/61B system manual, section "Parameters".

5.3 Startup with DBG60B keypad

5.3.1 General information

Startup with the DBG60B keypad is only **possible in VFC operating modes**. Startup in CFC and SERVO operating modes is only possible using the MOVITOOLS® MotionStudio operating software.

Required data

The following data is required to ensure startup is successful:

- Motor type (SEW or non-SEW motor)
- Motor data
  - Rated voltage and rated frequency
  - Additionally for non-SEW motors: Rated current, rated power, rated factor cosφ, and rated speed.
- Rated line voltage

The following data is also needed for startup with a speed controller:

- Encoder type and encoder resolution:

SEW encoder type	Startup parameters	
	Encoder type	PPR count
AK0H	HIPERFACE®	128
AS1H, ES1H, AV1H, AF1H	HIPERFACE®	1024
ES1S, ES2S, EV1S, EH1S, EF1H	SINE ENCODER	1024
ES1R, ES2R, EV1R, EH1R ES1T[1], ES2T[1], EV1T[1], EH1T[1]	INCREM. ENCODER	1024

1) DC 5 V TTL encoders ES1T, ES2T, EV1T and EH1T must be connected via the DWI11A option (see Installation section).

- Motor data
  - SEW motor: Brake yes or no and flywheel fan yes or no.
  - Non-SEW motor: Mass moment of inertia of motor, brake and fan
- Stiffness of the control system (factory setting = 1; suitable for most applications)

  If the drive tends to oscillate → setting < 1

  Transient recovery time is too long → Setting > 1

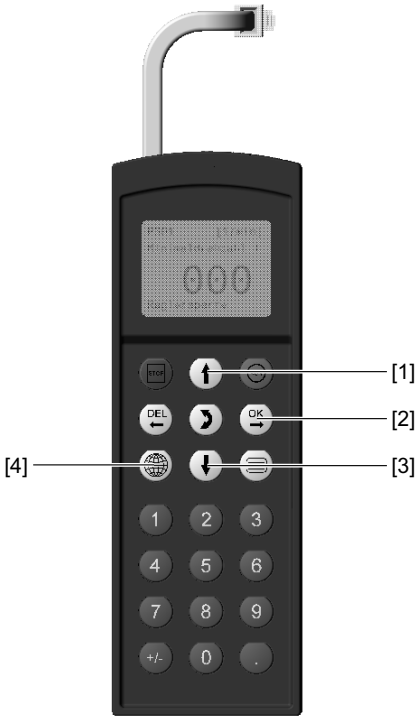
  Recommended setting range: 0.90 – 1 – 1.10 (factory setting = 1)
- Converted mass moment of inertia of the load (gear unit + driven machine) on the motor shaft
- Time required for the shortest ramp

INFORMATION

- Activate encoder monitoring (P504 = "ON") after completing the startup. The function and voltage supply of the encoder will then be monitored.
- If a Hiperface® encoder is connected, it is always monitored regardless of the setting of parameter P504. Encoder monitoring is not a safety function!

5.3.2 Selecting a language

The figure below shows the keys for selecting the language.



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[1] Key ↑ Move up to the next menu item
[2] Key OK Confirm entry
[3] Key ↓ Move down to the next menu item
[4] Key 🌐 A list of languages is displayed

The following text appears on the display when the keypad is switched on for the first time or after activating the start mode:

SEW
EURODRIVE

The symbol for language selection then appears on the display.

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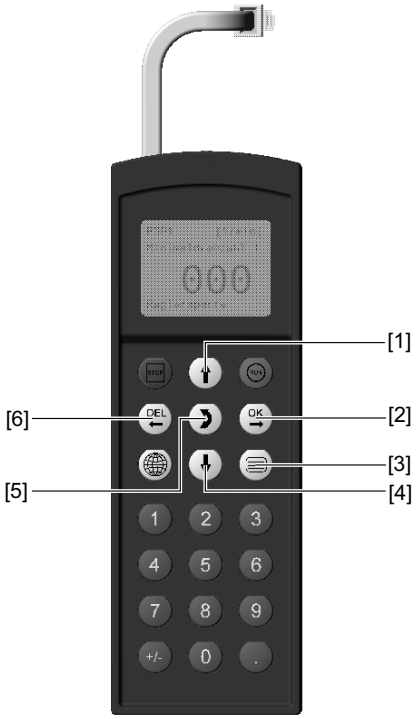
Proceed as follows to select the language:

- Press the 🌐 key. A list of languages is displayed on the screen.
- Use the ↑ / ↓ keys to select the language you require.
- Confirm your selection using the OK key. The basic display is now shown in your chosen language.

5.3.3 Startup

The figure below shows the keys required for startup.



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[1] Key ↑ Move up to the next menu item
[2] Key OK Confirm entry
[3] Key ☰ Activate the context menu
[4] Key ↓ Move down to the next menu item
[5] Key Change the menu, display mode ↔ edit mode
[6] Key DEL Cancel or abort startup

5.3.4 Startup procedure

1. "0" signal at terminal X13:1 (DIØØ "/CONTROL.INHIBIT"), e.g. by disconnecting the electronics terminal block X13.

0.00rpm 0.000Amp CONTROLLER INHIBIT

2. Activate the context menu by pressing the ☰ key.

BASIC VIEW PARAMETER MODE VARIABLE MODE

3. Press the ↓ key to scroll down to the "STARTUP" menu item.

MANUAL MODE **STARTUP** COPY TO DBG COPY TO MDX

4. Press the [OK] key to begin the startup procedure. The first parameter appears. The flashing cursor under the parameter number indicates that the keypad is in display mode.
   - Press the [↵] key to change to edit mode. The flashing cursor disappears.
   - Press the [↑] key or [↓] key to select "PARAMETER SET 1" or "PARAMETER SET 2".
   - Confirm the setting by pressing the [OK] key.
   - Press the [↵] key to return to display mode. The flashing cursor appears again.
   - Press the [↑] key to select the next parameter.

```
STARTUP
PREPARE FOR
STARTUP
```

```
C00*STARTUP

PARAMETER SET 1
PARAMETER SET 2
```

5. Select either stand-alone motor or group drive. Press the [↑] key to select the next parameter.

```
C22*MOTORS

SINGLE MOTOR
IDENT. MOTORS
```

6. Select the operating mode you require. Press the [↑] key to select the next parameter.

```
C26*OPER. MODE 1
STANDARD V/F
VFC
```

7. Select whether an encoder is to be evaluated. Press the [↑] key to select the next parameter.

```
C29*encoder

NO
YES
```

8. Select the operating mode you require. Press the [↑] key to select the next parameter.

```
C36*OPER.MODE

SPEED CONTROL
HOIST
```

9. Select the motor type. If a 2 or 4-pole SEW motor is connected, select the correct motor from the list. If a non-SEW motor or an SEW motor with more than four poles is connected, select "NON-SEW MOTOR" from the list.
   Press the [↑] key to select the next parameter.

```
C02*MOTOR TYPE 1
DT71D2
DT71D4
DT80K2
```

```
C02*MOTOR TYPE 1

NON-SEW MOTOR
DT63K4/DR63S4
```

10. Enter the rated motor voltage for the selected connection type according to the value specified on the nameplate.

    Example: Nameplate 230△ / 400⅄50 Hz
    ⅄ connection → enter "400 V".
    △ connection/transition point at 50 Hz → enter "230 V".
    △ connection, transition point at 87 Hz → Also enter 230 V. However, set parameter P302 "MAXIMUM SPEED 1" to the value for 87 Hz after startup first and then start the drive.

    Example: Nameplate 400△/690⅄ 50 Hz
    Only △ connection possible → enter "400 V".
    ⅄ connection is not possible.

    Press the [↑] key to select the next parameter.

```
C03*     V
MOT. RATED VOLT 1
  400.000
```

11. Enter the rated frequency specified on the motor nameplate.
    Example: 230△/400⅄ 50 Hz
    Enter "50 Hz" in ⅄ and △ connection.

    Press the [↑] key to select the next parameter.

```
C04*     Hz
MOT. RATED FREQ. 1
  50.000
```

FOR SEW MOTORS

12. The motor values are stored for SEW 2 and 4-pole motors and need not be entered.

FOR NON-SEW MOTORS

12. Enter the following motor nameplate data:
    - C10* rated motor current, observe connection type (⅄ or △).
    - C11* rated motor power
    - C12* power factor cos φ
    - C13* rated motor speed

13. Enter the rated power supply voltage (C05* for SEW motor, C14* for non-SEW motor).

```
C05*     V
RATED MAINS VLTG
  400.000
```

14. If no TF/TH is connected to X10:1/2 or X15 → Set "NO RESPONSE". If a TF/TH is connected, set the required error response. To select the sensor, you must set *P530 sensor type 1* after startup.

```
835* RESP. TF-SIG.

NO RESPONSE
DISPLAY ERROR
```

15. Start the calculation for the startup data by choosing "YES". The process lasts a few seconds.

```
C06*CALCULATION

NO
YES
```

FOR SEW MOTORS

16. The calculation is performed. After calculation, the next menu item appears automatically.

C06*SAVE
NO
YES

FOR NON-SEW MOTORS

16. For non-SEW motors, a calibration process is required to perform the calculation:
    - When prompted, apply a "1" signal to terminal X13:1 (DIØØ "/CONTROL.INHIBIT").
    - Apply a "0" signal to terminal X13:1 again after the calibration is complete.
    - After calculation, the next menu item appears automatically.

17. Set "SAVE" to "YES" The data (motor parameters) are copied to the non-volatile memory of MOVIDRIVE®.

STARTUP
DATA IS
BEING COPIED...

18. The startup procedure is now complete. Press the [DEL] key to return to the context menu.

MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX

19. Press the [↓] key to scroll down to the "QUIT" menu item.

SIGNATURE
QUIT
BASIC VIEW

20. Confirm the setting by pressing the [OK] key. The basic display appears.

0.00rpm
0.000Amp
CONTROLLER INHIBIT

5.3.5 Starting up the speed controller

Startup is performed without the speed controller first (→ Section "Startup procedure, steps 1 through 17").

Important: Set encoder evaluation to "YES".

C29*encoder
NO
YES

1. Initiate the startup of the speed controller with "YES".

C09*n-CONTROL?
NO
YES

2. The selected operating mode is displayed. If the setting is correct, go to the next menu item.

C00*STARTUP
PARAMETER SET 2
VFC-n CONTROL

3. Select the correct encoder type.

C15*ENCODER TYPE
INCREM. ENCOD. TTL
SINE ENCODER
RESERVED

4. Set the correct encoder resolution.

C16*ENC. RESOLUT.
512 Inc
1024 Inc
2048 Inc

FOR SEW MOTORS

5. Enter whether the motor has a brake.

C17*BRAKE
WITHOUT
WITH

6. Set the stiffness of the control system.
   If the drive tends to oscillate → setting < 1
   Transient recovery time is too long → Setting > 1
   Recommended setting range: 0,90 – 1 – 1,10

C18*
STIFFNESS
1.000

7. Enter whether the motor has a flywheel fan (Z fan).

C19*Z FAN
WITHOUT
WITH

FOR NON-SEW MOTORS

5. Enter the moment of inertia of the motor.

```
D00*
J0 OF THE MOTOR
  4.600
```

6. Set the stiffness of the control system.
   If the drive tends to oscillate → setting < 1
   Transient recovery time is too long → Setting > 1
   Recommended setting range: 0,90 – 1 – 1,10

```
C18*
STIFFNESS
  1.000
```

7. Enter the moment of inertia of the brake and fan.

```
D00*
J BRAKE+FAN
  1.000
```

8. Enter the mass moment of inertia of the load (gear unit + driven machine) extrapolated for the motor shaft.

```
C20*  10e–4kgm²
LOAD MOMENT OF
INERTIA
  0.200
```

9. Enter the time for the shortest ramp you want.

```
C21*    s
SHORTEST RAMP
  0.100
```

10. Start the calculation for the startup data by choosing "YES". The process lasts a few seconds.

```
C06*CALCULATION

NO
YES
```

11. The calculation is performed. After calculation, the next menu item appears automatically.

```
C06*SAVE

NO
YES
```

12. Set "SAVE" to "YES" The data (motor parameters) are copied to the non-volatile memory of MOVIDRIVE®.

```
STARTUP
DATA IS
BEING COPIED...
```

13. The startup procedure is now complete. Press the [DEL] key to return to the context menu.

```
MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX
```

14. Press the [↓] key to scroll down to the "QUIT" menu item.

```
SIGNATURE
QUIT

BASIC VIEW
```

15. Confirm the setting by pressing the [OK] key. The basic display appears.

```
0.00rpm
0.000Amp
CONTROLLER INHIBIT
```

- Once startup is complete, copy the parameter set from MOVIDRIVE® to the DBG60B keypad. You have the following options:
  - In the context menu, select the "COPY TO DBG" menu item. Confirm the setting by pressing the [OK] key. The parameter set is copied from MOVIDRIVE® to DBG60B.
  - In the context menu, select the "PARAMETER MODE" menu item. Select parameter P807 "MDX → DBG". The parameter set is copied from MOVIDRIVE® to DBG60B.
- The parameter set can now be copied to other MOVIDRIVE® units using DBG60B. Plug the DBG60B keypad into the other inverter. You have the following options to copy the parameter set from DBG60B to another inverter:
  - In the context menu of the new inverter, choose the "COPY TO MDX" menu item and confirm your entry using the [OK] key. The parameter set is copied from DBG60B to MOVIDRIVE®.
  - In the context menu, select the "PARAMETER MODE" menu item. Select parameter P806 "DBG → MDX". The parameter set is copied from DBG60B to MOVIDRIVE®.

⚠ DANGER

Parameter settings incorrect due to unsuitable data sets.

Severe or fatal injury.

Make sure that the data set you copy is suitable for the application.

- Enter any parameter settings which differ from the factory settings in the parameter list (→ page 106).
- In the case of non-SEW motors, set the correct brake application time (P732 / P735).
- Observe the notes for starting the motor in the section "Starting the Motor" (→ page 102).
- In case of △ connection and transition point at 87 Hz, set parameter P302/312 "Maximum speed 1/2" to the value for 87 Hz.
- Activate encoder monitoring for TTL and sin/cos encoders (P504 = "ON"). **Encoder monitoring** is **not a safety function**.

5.3.6 Setting parameters

Proceed in this order to set the parameters:

- Call up the context menu using the ☰ key. In the context menu, select the "PARAMETER MODE" menu item. Confirm your entry with the OK key. The flashing cursor under the parameter number indicates that the keypad is in parameter mode.
- Press the ↻ key to change to edit mode. The flashing cursor disappears.
- You can use the ↑ key or ↓ key to select or set the correct parameter value.
- Confirm the setting by pressing the OK key.
- Press the ↻ key to return to the parameter mode. The flashing cursor appears again.
- Press the ↑ key to select the next parameter.

5.4 Operation of MOVITOOLS® MotionStudio

5.4.1 Via MOVITOOLS® MotionStudio

Tasks

The software package enables you to perform the following tasks with consistency:

- Establishing communication with units
- Executing functions with the units

Establishing communication with other units

The SEW Communication Server is integrated into the MOVITOOLS® MotionStudio software package for establishing communication with the units.

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the units communicate via these communication channels using their communication options. You can operate up to four communication channels at the same time.

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS-485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT
- Fieldbus (PROFIBUS DP/DP-V1)
- Tool Calling Interface

The available channels can vary depending on the units and its communication options.

Executing functions with the units

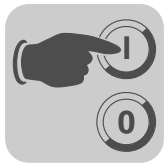
The software package offers uniformity in executing the following functions:

- Parameterization (for example in the parameter tree of the unit)
- Startup
- Visualization and diagnostics
- Programming

The following basic components are integrated into the MOVITOOLS® MotionStudio software package, allowing you to use the units to execute functions:

- MotionStudio
- MOVITOOLS®

All functions communicate using **tools**. MOVITOOLS® MotionStudio provides the right tools for every unit type.



Technical support

SEW-EURODRIVE offers you a 24-hour service hotline.

Simply dial **(+49) 0 18 05** and then enter the letters **SEWHELP** via the telephone keypad. Of course, you can also dial **(+49) 0 18 05 - 7 39 43 57**.

Online help

After installation, the following types of help are available to you:

- This documentation is displayed in a help window after you start the software.

  If the help window does not appear at the start, deactivate the "Display" control field, in the menu under [Settings] / [Options] / [Help].

  If the help window appears again, activate the "Display" control field, in the menu under [Settings] / [Options] / [Help].
- Context-sensitive help is available for the fields which require you to enter values. For example, you can use the <F1> key to display the ranges of values for the unit parameters.

5.4.2 First steps

Starting the software and creating a project

Proceed as follows to start MOVITOOLS® MotionStudio and create a project:

1. Start the MOVITOOLS® MotionStudio from the Windows start menu via:

   [Start]/[Programs]/[SEW]/[MOVITOOLS-MotionStudio]/[MOVITOOLS-MotionStudio]
2. Create a project with name and storage location.

Establishing communication and scanning the network

Proceed as follows to establish a communication with MOVITOOLS® MotionStudio and scan your network:

1. Set up a communication channel to communicate with your units.

   For detailed information on how to configure a communication channel, see the section regarding the relevant communication type.
2. Scan your network (unit scan). Press the [Start network scan] button [1] in the toolbar.

1132720523

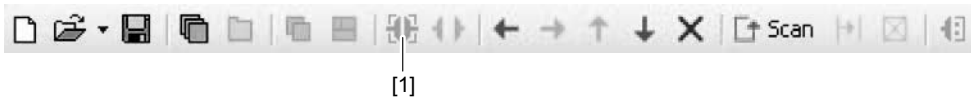
1. Select the unit you want to configure.
2. Right-click to open the context menu.

   As a result you will see a number of unit-specific tools to execute various functions with the units.

Starting up the units (online)

Proceed as follows to start up the units (online):

1. Switch to the network view.
2. Click on "Switch to online mode" [1] in the toolbar.



1184030219

[1] "Switch to online mode" symbol

3. Select the unit you want to startup.
4. Open the context menu and select the command [Startup] / [Startup].

   The Startup wizard opens.
5. Follow the instructions of the startup wizard and then load the startup data onto your unit.

Startup for HTL motor encoders

Observe the following safety notes when starting up an HTL motor encoder to MOVIDRIVE® MDX61B:

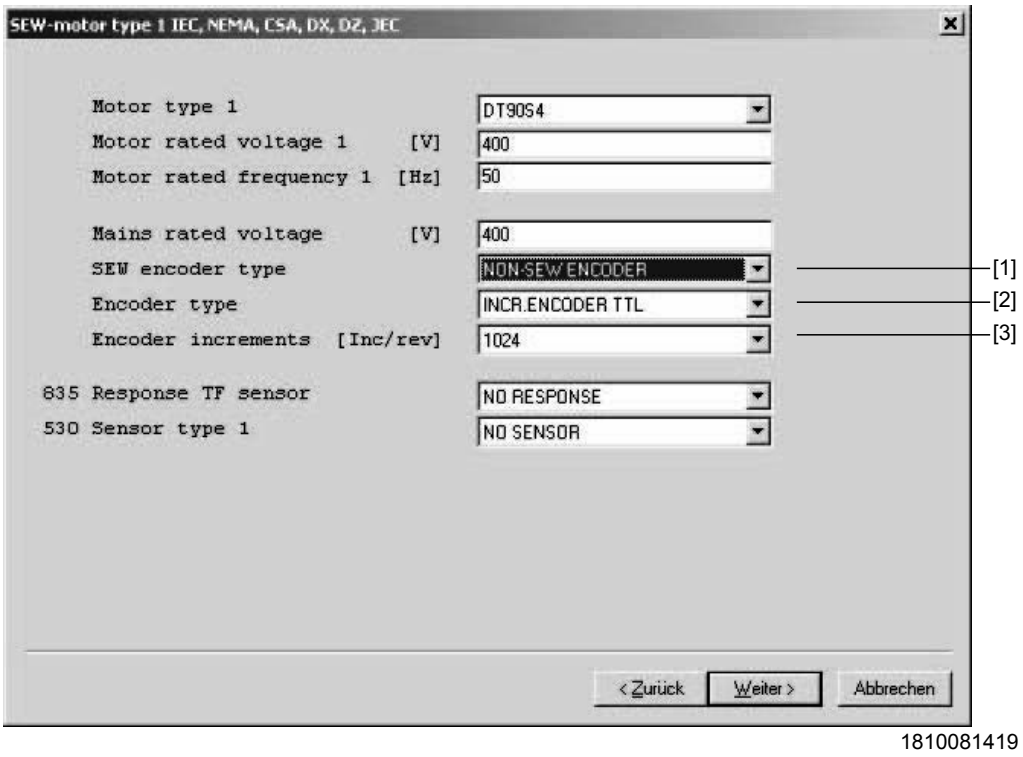


Fig. 23: Settings for startup of a motor with HTL motor encoder

[1] "SEW encoder type" selection list
[2] "Encoder type" selection list
[3] "PPR count" selection list

- Select "Non-SEW encoder" from the "SEW encoder type" list [1].
- Select "INCREM. ENC. TTL" from the "Encoder type" list [2].
- In the dropdown menu "PPR count" [3] select the PPR count (1024 for SEW HTL encoders) printed on the HTL motor encoder.

5.5 Starting the motor

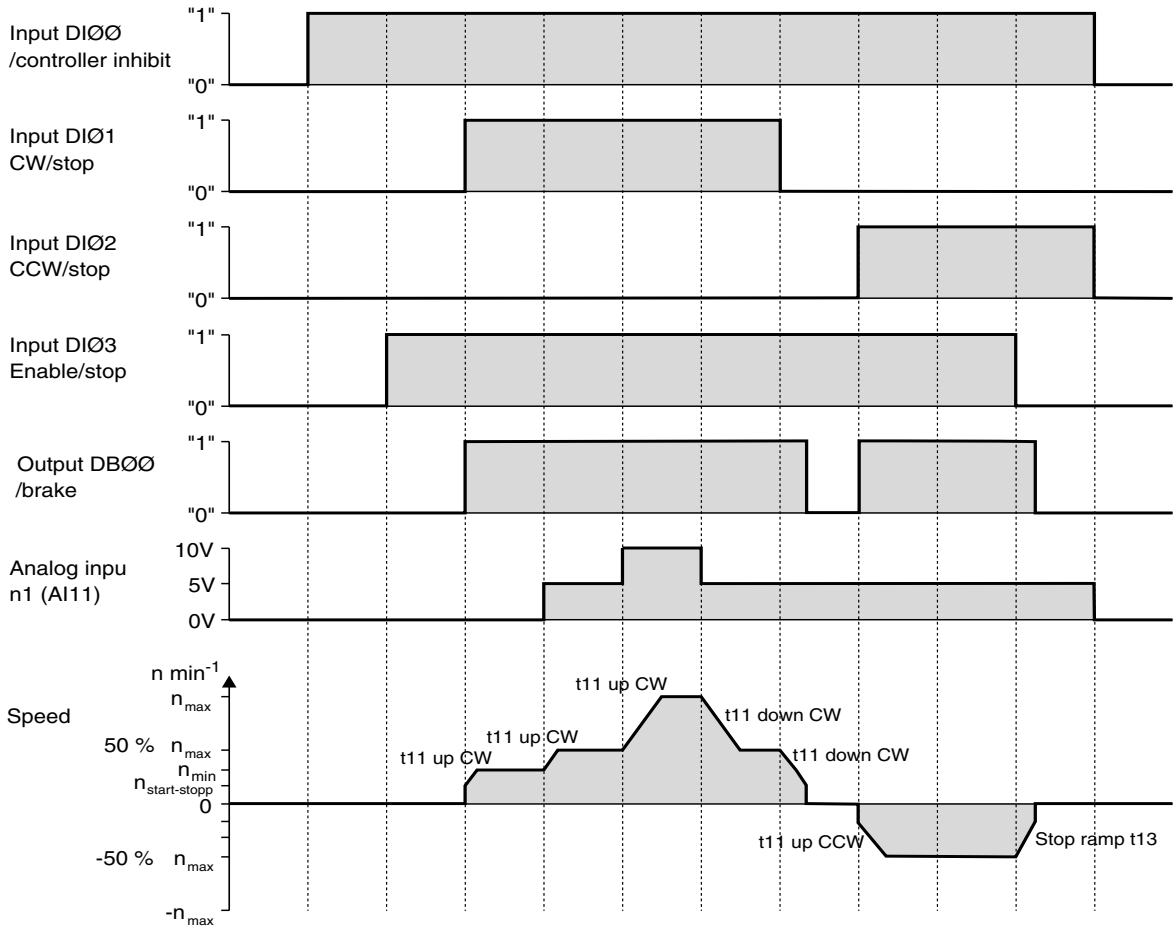
5.5.1 Analog setpoint selection

The following table shows the signals that must be present on terminals X11:2 (AI1) and X13:1 – X13:6 (DIØØ – DIØ5) when the "UNIPOL/FIX.SETPT" setpoint is selected (P100) to operate the drive with an analog setpoint entry.

Function	X11:2 (AI11) Analog input n1	X13:1 (DIØØ) /Controller inhibit	X13:2 (DIØ1) CW/stop	X13:3 (DIØ2) CCW/stop	X13:4 (DIØ3) Enable/stop	X13:5 (DIØ4) n11/n21	X13:6 (DIØ5) n12/n22
Controller inhibit	X	"0"	X	X	X	"0"	"0"
Stop	X	"1"	X	X	"0"	"0"	"0"
Enable and stop	X	"1"	"0"	"0"	"1"	"0"	"0"
Clockwise at 50 % n_{max}	5 V	"1"	"1"	"0"	"1"	"0"	"0"
Clockwise with n_{max}	10 V	"1"	"1"	"0"	"1"	"0"	"0"
Counterclockwise with 50 % n_{max}	5 V	"1"	"0"	"1"	"1"	"0"	"0"
Counterclockwise with n_{max}	10 V	"1"	"0"	"1"	"1"	"0"	"0"

5.5.2 Travel diagram

The following travel diagram shows by way of example how the motor is started with the wiring of terminals X13:1 – X13:4 and analog setpoints. Binary output X10:3 (DBØØ "/ Brake") is used for switching brake contactor K12.



	INFORMATION
	The motor is not energized in the event of a controller inhibit (DIØØ = "0"). A motor without brake will coast to standstill.

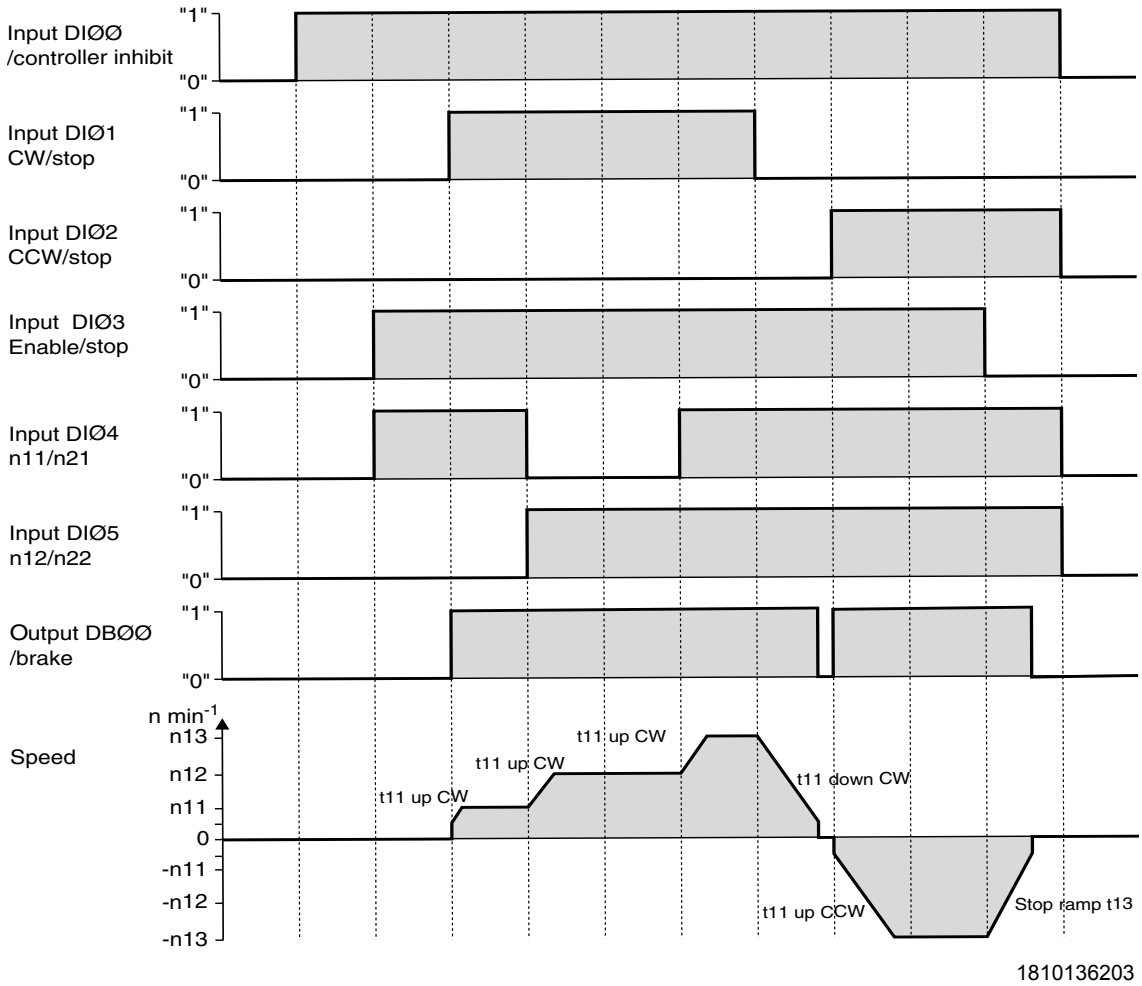
5.5.3 Fixed setpoints

The following table shows the signals that must be present on terminals X13:1 – X13:6 (DIØØ – DIØ5) when the "UNIPOL/FIX.SETPT" setpoint is selected (P100) to operate the drive with the fixed setpoints.

Function	X13:1 (DIØØ) /Controller inhibit	X13:2 (DIØ1) CW/stop	X13:3 (DIØ2) CCW/stop	X13:4 (DIØ3) Enable/stop	X13:5 (DIØ4) n11/n21	X13:6 (DIØ5) n12/n22
Controller inhibit	"0"	X	X	X	X	X
Stop	"1"	X	X	"0"	X	X
Enable and stop	"1"	"0"	"0"	"1"	X	X
CW operation with n11	"1"	"1"	"0"	"1"	"1"	"0"
CW operation with n12	"1"	"1"	"0"	"1"	"0"	"1"
CW operation with n13	"1"	"1"	"0"	"1"	"1"	"1"
CCW operation with n11	"1"	"0"	"1"	"1"	"1"	"0"

5.5.4 Travel diagram

The following travel diagram shows an example of how the drive is started with the wiring of terminals X13:1 – X13:6 and internal fixed setpoints. Binary output X10:3 (DBØØ "/Brake") is used for switching brake contactor K12.



	INFORMATION
	The motor is not energized in the event of a controller inhibit (DIØØ = "0"). A motor without brake will coast to standstill.

5.5.5 Manual operation

The inverter can be controlled using the DBG60B keypad in manual operation (context menu → manual operation). The 7-segment display on the unit shows "H" during manual operation.

The binary inputs are then without any functions for the duration of manual operation, with the exception of X13:1 (DIØØ "/Controller inhibit"). Binary input X13:1 (DIØØ "/Controller inhibit") must get a "1" signal to enable the drive to be started in manual operation. The drive can also be stopped in manual operation by X13:1 = "0".

The direction of rotation is not determined by the "CW/stop" or "CCW/stop" binary inputs. Instead, you select the direction of rotation using the DBG60B keypad. Enter the required speed and then the direction of rotation (+ ≙ CW / – ≙ CCW) using the sign key (+/–).

Manual operation remains active when the power supply is switched off and on; however, the inverter is then inhibited. Use the "Run" key to enable and start the inverter at n_{min} in the selected direction of rotation. The speed is increased and decreased using the ↑ and ↓ keys.

	INFORMATION
	The signals at the binary inputs take effect as soon as manual operation is finished. Binary input X13:1 (DIØØ) /Controller inhibit does not have to be switched from "1" to "0" and back to "1". The drive can start according to the signals at the binary inputs and the setpoint sources.

	⚠ DANGER
	Risk of crushing if the motor starts up unintentionally. Severe or fatal injuries. • Ensure that the motor cannot start inadvertently, for example, by removing the signal terminal block X13. • Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.

5.5.6 Startup in "VFC & Flying start" operating mode

The parameter *P320 Automatic adjustment* is deactivated in the "VFC & Flying start" mode. It is important that the stator resistance (*P322 IxR compensation 1)* is set correctly to ensure that the flying start function is performed properly.

	INFORMATION
	Due to exact motor data, the proper function of the flying start function has only been tested with SEW motors. SEW-EURODRIVE does not guarantee a proper function of the flying start function for non-SEW motors.

Note the following when performing **startup for an SEW motor** with DBG60B or MOVITOOLS® MotionStudio:

The value of the stator resistance (*P322 IxR compensation 1)* is set for an SEW motor at operating temperature (winding temperature 80 °C). For flying start with a cold motor, you have to reduce the stator resistance *(P322 IxR compensation 1)* by 0.34 % per Kelvin.

Note the following when performing **startup for a non-SEW motor** with DBG60B or MOVITOOLS® MotionStudio:

Measure the stator resistance *(P322 IxR compensation 1)* at startup. Proceed as follows:

1. Start up the motor in "VFC" operation mode.
2. Enable the **motor in standstill**.
3. **Note** the value of *P322 IxR compensation 1* (stator resistance) for step 6.
4. Select the "VFC & Flying start" operating mode.
5. Set *P320 "Automatic adjustment 1"* to "Off".
6. In *P322 IxR compensation 1* (stator resistance) enter the **value you noted** in step 3.

5.6 Complete parameter list

5.6.1 General information

- The parameters in the quick menu are marked by a "\" (= display on the DBG60B keypad).
- The factory setting for the parameter is highlighted in bold.

Par.	Name	Value range
DISPLAY VALUES		
00_	**Process values**	
000	Speed	-6100 – 0 – 6100 rpm
\001	User display	"Text"
002	Frequency	0 – 600 Hz
003	Actual position	0 – 2^{31}-1 inc
004	Output current	0 – 250 % I_N
005	Active current	-250 – 0 – 250 % I_N
\006	Motor utilization 1	0 – 200 %
007	Motor utilization 2	0 – 200 %
008	DC link voltage	0 – 1000 V
009	Output current	A
01_	**Status displays**	
010	Inverter status	
011	Operating status	
012	Error status	
013	Current parameter set	1/2
014	Heat sink temperature	-20 – 0 – 100 °C
015	Operating hours	h
016	Enable hours	h
017	Work	kWh
018	KTY utilization 1	0 – 200 %
019	KTY utilization 2	0 – 200 %
02_	**Analog setpoints**	
020	Analog input AI1	-10 – 0 – 10 V
021	Analog input AI2	-10 – 0 – 10 V
022	External current limit	0 – 100 %
03_	**Binary inputs of basic unit**	
030	Binary input DIØØ	/CONTR. INHIBIT
031	Binary input DIØ1	Not in DBG60B
032	Binary input DIØ2	
033	Binary input DIØ3	
034	Binary input DIØ4	
035	Binary input DIØ5	
036	Binary input DIØ6	
037	Binary input DIØ7	
\039	Status of binary inputs DIØØ – DIØ7	

Par.	Name	Value range
04_	**Binary input options**	
040	Binary input DI1Ø	Not in DBG60B
041	Binary input DI11	
042	Binary input DI12	
043	Binary input DI13	
044	Binary input DI14	
045	Binary input DI15	
046	Binary input DI16	
047	Binary input DI17	
\048	Status of binary inputs DI1Ø - DI17	
05_	**Binary outputs of basic unit**	
050	Binary output DBØØ	/BRAKE
051	Binary output DOØ1	Not in DBG60B
052	Binary output DOØ2	
053	Binary output DOØ3	
054	Binary output DOØ4	
055	Binary output DOØ5	
\059	Status of binary outputs DBØØ, DOØ1 – DOØ5	
06_	**Binary outputs option**	
060	Binary output DO1Ø	Not in DBG60B
061	Binary output DO11	
062	Binary output DO12	
063	Binary output DO13	
064	Binary output DO14	
065	Binary output DO15	
066	Binary output DO16	
067	Binary output DO17	
\068	Status of binary outputs DO1Ø - DO17	
07_	**Unit data**	
070	Unit type	
071	Rated output current	
072	Option 1 encoder slot	
073	Option 2 fieldbus slot	
074	Option 3 expansion slot	
076	Basic unit firmware	
077	DBG firmware	Only in DBG60B
078	Technology function	
079	Unit type	Standard Application

08_	**Error memory**	
\080	Error t-0	
081	Error t-1	
082	Error t-2	
083	Error t-3	
084	Error t-4	
09_	**Bus diagnostics**	
090	PD configuration	
091	Fieldbus type	

092	Fieldbus baud rate	
093	Fieldbus address	
094	PO1 Setpoint	
095	PO2 Setpoint	
096	PO3 Setpoint	
097	PI1 Actual value	
098	PI2 Actual value	
099	PI3 Actual value	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
1__	**SETPOINTS / RAMP GENERATORS**		
10_	**Setpoint selection**		
\100	Setpoint source	UNIPOL./FIX.SETPT. BIPOL./FIX.SETPT UNIPOL./FIX.SETPT. RS485 Fieldbus Motor potentiometer Motor pot.+analog 1 Fix.setpt.+analog 1 Master SBus1 Master-RS485 SBus 1 Frequency input SBus 2 IPOS setpoint	
101	Control signal source	**Terminals**	
102	Frequency scaling	0.1 – **10 –** 65 kHz	
105	Fault response to wire breakage AI1	**No response** Immediate stop/fault Rapid stop/fault Rapid stop/warning	
11_	**Analog input AI1**		
110	AI1 scaling	-10 – -0.1 / 0.1 – **1 –** 10	
111	AI1 Offset	-500 – **0 –** 500 mV	
112	AI1 operating mode	Ref. N-MAX Ref. 3000 rpm U-Off., N-MAX N-Off., N-MAX N-MAX, 0-20 mA N-MAX, 4-20 mA	
113	AI1 voltage offset	-10 – **0** – 10 V	
114	AI1 speed offset	-6000 – **0 –** 6000 rpm	
115	Filter speed setpoint	0 – **5** – 100 ms 0 = Filter off	
12_	**Analog inputs (optional)**		
120	AI2 operating mode	No function 0 – 10 V + setpt.1 0 – 10 V I-limit: Actual value PID controller	
13_	**Speed ramps 1**		

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
\130	Ramp t11 up CW	0 – **2** – 2000 s	
\131	Ramp t11 down CW	0 – **2** – 2000 s	
\132	Ramp t11 up CCW	0 – **2** – 2000 s	
\133	Ramp t11 down CCW	0 – **2** – 2000 s	
\134	Ramp t12 UP=DOWN	0 – **10** – 2000 s	
135	S pattern t12	**0 –** 3	
\136	Stop ramp t13	0 – **2** – 20 s	
\137	Emergency stop ramp t14	0 – **2** – 20 s	
138	Ramp limit VFC	**Yes** No	
139	Ramp monitoring 1	Yes **No**	
14_	**Speed ramps 2**		
140	Ramp t21 up CW	0 – **2** – 2000 s	
141	Ramp t21 down CW	0 – **2** – 2000 s	
142	Ramp t21 up CCW	0 – **2** – 2000 s	
143	Ramp t21 down CCW	0 – **2** – 2000 s	
144	Ramp t22 UP=DOWN	0 – **10** – 2000 s	
145	S pattern t22	**0 –** 3	
146	Stop ramp t23	0 – **2** – 20 s	
147	Emergency stop ramp t24	0 – **2** – 20 s	
149	Ramp monitoring 2	**No** Yes	
15_	**Motor potentiometer (parameter sets 1 and 2)**		
150	Ramp t3 up	0.2 – **20 –** 50 s	
151	Ramp t3 down	0.2 – **20 –** 50 s	
152	Save last setpoint	**OFF** ON	
16_	**Fixed setpoints 1**		
\160	Internal setpoint n11	-6000 – **150** – 6000 rpm (% I_N)	
\161	Internal setpoint n12	-6000 ... **750** ... 6000 rpm (% I_N)	
\162	Internal setpoint n13	-6000 ... **1500** ... 6000 rpm (% I_N)	
17_	**Fixed setpoints 2**		
170	Internal setpoint n21	-6000 – **150** – 6000 rpm (% I_N)	
171	Internal setpoint n22	-6000 – **750** – 6000 rpm (% I_N)	
172	Internal setpoint n23	-6000 – **1500** – 6000 rpm (% I_N)	
2__	**CONTROLLER PARAMETERS**		
20_	**Speed control (only parameter set 1)**		
200	P-gain n-controller	0.01 – **2** – 32	
201	Time constant n-controller	0 – **10** – 300 ms	
202	Gain Accel. prectrl.	**0** – 65	
203	Filter acceleration precontrol	**0** – 100 ms	
204	Filter actual speed value	**0 –** 32 ms	
205	Load precontrol CFC	**– 150 % –** 0 – 150 %	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
206	Sampling time n-controller	**1 ms** 0.5 ms	
207	Load precontrol VFC	**– 150 %** – 0 – 150 %	
21_	**Hold controller**		
210	P gain hold controller	0.1 – **0.5** – 32	
22_	**Synchronous operation control (only parameter set 1)**		
220	P-gain (DRS)	1 – **10** – 200	
221	Master gear ratio factor	**1** – 3 999 999 999	
222	Slave gear ratio factor	**1 –** 3 999 999 999	
223	Mode selection	**Mode 1** Mode 2 Mode 3 Mode 4 Mode 5 Mode 6 Mode 7 Mode 8	
224	Slave counter	-99 999 999 – -10 / **10 –** 99 999 999 Inc	
225	Offset 1	-32 767 – -10 / **10** – 32 767 Inc	
226	Offset 2	-32 767 – -10 / **10 –** 32 767 Inc	
227	Offset 3	-32 767 – -10 / **10** – 32 767 Inc	
228	Precontrol filter (DRS)	**0 –** 100 ms	With MOVITOOLS® MotionStudio only. Not visible on the DBG60B keypad.
23_	**Synchr. oper. with synchr. encoder**		
230	Synchronous encoder	**Off** Equal-ranked Chain	
231	Factor slave encoder	**1** – 1000	
232	Factor slave synchronous encoder	**1 –** 1000	
233	Synchronous encoder resolution	128 / 256 / 512 / **1024** / 2048	
234	Master encoder resolution	128 / 256 / 512 / **1024** / 2048	
24_	**Synchronous operation with catch up**		
240	Synchronous speed	-6000 – **1500 –** 6000 rpm	
241	Synchronous ramp	0 – **2 –** 50 s	
26_	**Process controller parameters**		
260	Operating mode	**Controller off** / Control / Step response	
261	Cycle time	1 / **5** / 10 ms	
262	Interruption	**No response** / Move closer to setpoint	
263	Factor K_p	0 – **1** – 32,767	
264	Integrative time T_n	**0** – 10 – 65535 ms	
265	Derivative time T_V	**0** – 1 – 30 ms	
266	Precontrol	–32767 – **0** – 32767	
27_	**Process controller input values**		
270	Setpoint source	**Parameters** / IPOS variable / Analog 1 / Analog 2	
271	Setpoint	–32767 – **0** – 32767	
272	IPOS setpoint address	**0** – 1023	
273	Time constant	**0** – 0.01 – 2000 s	
274	Scaling setpoints	–32,767 – **1** – 32,767	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
275	Actual value source	**Analog 1** / Analog 2 / IPOS Variable	
276	IPOS actual value address	**0** – 1023	
277	Actual value scaling factor	–32.767 – **1** – 32.767	
278	Actual offset value	–32767 – **0** – 32767	
279	Time constant actual value	**0** – 500 ms	
28_	**Process controller limits**		
280	Minimum offset + actual value	–32767 – **0** – 32767	
281	Maximum offset + actual value	–32767 – **10000** – 32767	
282	Minimum output PID controller	–32767 – **-1000** – 32767	
283	Maximum output PID controller	–32767 – **10000** – 32767	
284	Minimum output process controller	–32767 – **0** – 32767	
285	Maximum output process controller	–32767 – **7500** – 32767	
3__	**MOTOR PARAMETERS**		
30_ / 31_	**Limits 1 / 2**		
\300 / 310	Start/stop speed 1 / 2	0 – 150 rpm	
\301 / 311	Minimum speed 1 / 2	0 – **15** – 6100 rpm	
\302 / 312	Maximum speed 1 / 2	0 – **1500 –** 6100 rpm	
\303 / 313	Current limit 1 / 2	0 – 150 % (BG0: 0 – 200 % I_N)	
304	Torque limit	**0 –** 150 % (BG0: 0 – 200 %)	
32_ / 33_	**Motor compensation 1 / 2 (asynchronous)**		
\320 / 330	Automatic adjustment 1/2	Off **On**	
321 / 331	Boost 1/2	**0 –** 100 %	
322 / 332	IxR adjustment 1	0 – 100 %	
323 / 333	Premagnetizing time 1 / 2	0 – 2 s	
324 / 334	Slip compensation 1 / 2	0 – 500 rpm	
34_	**Motor protection**		
340 / 342	Motor protection 1/2	**Off** On (asynchronous) On (synchronous)	
341 / 343	Type of cooling 1/2	**Fan cooled** Forced cooling	
344	Interval for motor protection	0.1 – **4 –** 20 s	
345 / 346	I_N/U_L monitoring 1 / 2	0.1 – 500 A	
35_	**Motor direction of rotation**		
350 / 351	Direction of rotation reversal 1 / 2	**Off** On	
36_	**Startup (only available in DBG60B)**		
360	Startup	Yes/**No**	Only available in DBG60B, not in MOVITOOLS® Motion Studio/SHELL.
4__	**REFERENCE SIGNALS**		
40_	**Speed reference signal**		
400	Speed reference value	0 – **1500** – 6000 rpm	
401	Hysteresis	0 – **100** – 500 rpm	
402	Delay time	0 – **1** – 9 s	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
403	Signal = "1" if:	**$n < n_{ref}$** $n > n_{ref}$	
41_	**Speed window signal**		
410	Window center	0 – **1500 –** 6000 rpm	
411	Range width	**0 –** 6000 rpm	
412	Delay time	0 – **1** – 9 s	
413	Signal = "1" if:	**Inner** Outside	
42_	**Speed setpoint/actual value comparison**		
420	Hysteresis	0 – **100** – 300 rpm	
421	Delay time	0 – **1** – 9 s	
422	Signal = "1" if:	$n \neq n_{setp}$ **$n = n_{setp}$**	
43_	**Current reference signal**		
430	Current reference value	0 – **100** – 200 % I_N	
431	Hysteresis	0 – **5 –** 30 % I_N	
432	Delay time	0 – **1** – 9 s	
433	Signal = "1" if:	**$I < I_{ref}$** $I > I_{ref}$	
44_	**Imax signal**		
440	Hysteresis	0 – **5** – 50 % I_N	
441	Delay time	0 – **1** – 9 s	
442	Signal = "1" if:	$I = I_{max}$ / **$I < I_{max}$**	
5__	**MONITORING FUNCTIONS**		
50_	**Speed monitoring**		
500 / 502	Speed monitoring 1/2	Off Motor Regenerative **Mot. & regener.**	
501 / 503	Delay time 1/2	0 – **1** – 10 s	
504	Encoder monitoring motor	**No** Yes	
505	Synchronous encoder monitoring	**No** Yes	
51_	**Synchronous operation monitoring**		
510	Positional tolerance slave	10 – **25** – 32 768 Inc	
511	Lag error prewarning	**50 –** 99 999 999 Inc	
512	Lag error limit	100 – **4000 –** 99 999 999 Inc	
513	Deceler. Lag error signal	0 – **1** – 99 s	
514	Counter LED display	10 – **100 –** 32 768 Inc	
515	Delay time position signal	5 – **10** – 2000 ms	
516	X41 Encoder monitoring	Yes **No**	
517	X41 Pulse count monitoring	Yes **No**	
518	X42 Encoder monitoring	Yes **No**	
519	X42 Pulse count monitoring	Yes **No**	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
52_	**Mains OFF monitoring**		
520	Mains OFF response time	**0 –** 5 s	
521	Mains OFF response	**Controller inhibit** Emergency stop	
522	Phase failure monitoring	**On** Off	
53_	**Motor temperature protection**		
530	Sensor type 1	**No sensor** TF/TH/KTY (KTY: only for DS/CM motors)	
531	Sensor type 2	**No sensor** TF/TH/KTY (KTY: only for DS/CM motors)	
532	Source of motor temperature 1	X10/**X15**	
533	Source of motor temperature 2	X10/**X15**	
54_	**Gear unit/motor monitoring**		
540	Response to drive vibration / warning	**Display error**	**The following fault responses can be programmed:** No response • display error • imm. stop/fault • emerg.st./fault • rapid stop/fault • rapid stop/warng. • emerg.st./warng. • rapid stop/warng.
541	Response to drive vibration / fault	**Rapid stop/warning**	
542	Response to oil aging/warning	**Display error**	
543	Response to oil aging/fault	**Display error**	
544	Response to oil aging/overtemperature	**Display error**	
545	Response to oil aging/ready	**Display error**	
549	Response to brake wear	**Display error**	
55_	**DCS safety monitor**		
550	Status DCS safety monitor	Display value that cannot be changed	
551	Binary inputs DCS 1 – 8		
552	Binary outputs DCS DO0_P – DO2_M		
553	Serial number DCS		
554	CRC DCS		
555	Fault response DCS	**Immediate stop** Malfunction	**The following fault responses can be programmed:** No response • display error
556	DCS alarm response		
557	Actual position source DCS	**Motor encoder (X15)** Ext. encoder (X14) Absolute encoder (X62)	
56_	**Current limit Ex-e motor:**		
560	Current limit Ex-e motor:	On **Off**	
561	Frequency A	0 – **5** – 60 Hz	
562	Current limit A	0 – **50** – 150 %	
563	Frequency B	0 – **10** – 104 Hz	
564	Current limit B	0 – **80** – 200 %	
565	Frequency C	0 – **25** – 104 Hz	
566	Current limit C	0 – **100** – 200 %	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
6__	**TERMINAL ASSIGNMENT**		
60_	**Binary inputs of basic unit**		
-	Binary input DIØØ	Fixed assignment with: **/CONTR. INHIBIT**	
600	Binary input DIØ1	**CW/stop**	**The following functions can be programmed:** No function • enable/stop • CW/stop • CCW/stop • n11/n21 • n12/n22 • fix. setpt. sw.over • param. sw.over • ramp sw.over • Motor potentiometer up • motor potentiometer down • /Ext. error • error reset • /hold control • /CW limit switch • /CCW limit switch • IPOS input • reference cam • ref. trav. start • slave free run • setpoint hold • mains on • set DRS zero point • DRS slave start • DRS teach in • DRS master stopped • oscillation/warning • break wear • oil aging/warning • oil aging/error • oil aging overtemp. • oil aging/ready
601	Binary input DIØ2	**CCW/stop**	
602	Binary input DIØ3	**Enable/stop**	
603	Binary input DIØ4	**n11/n21**	
604	Binary input DIØ5	**n12/n22**	
605	Binary input DIØ6	**No function**	
606	Binary input DIØ7	**No function**	
61_	**Binary inputs option**		
610	Binary input DI1Ø	**No function**	
611	Binary input DI11	**No function**	
612	Binary input DI12	**No function**	
613	Binary input DI13	**No function**	
614	Binary input DI14	**No function**	
615	Binary input DI15	**No function**	
616	Binary input DI16	**No function**	
617	Binary input DI17	**No function**	
62_	**Binary outputs of basic unit**		
-	Binary output DBØØ	Fixed assignment with: **/Brake**	
620	Binary output DOØ1	**Ready**	**The following signals can be programmed:** No function • /malfunction • ready • output stage on • rotating field on • brake rel • brake engaged • motor standstill • parameter set • speed reference • speed window • nom./act.val.comp. • curr. reference • Imax signal • /motor utilization 1 • /motor utiliz. 2 • /DRS PREWARN. • /DRS lag error • DRS slave in pos. • IPOS in position • IPOS reference • IPOS output • /IPOS malfunction • reserved • Ex-e current limit • LSM commutation • S pattern • safe stop
621	Binary output DOØ2	**/fault**	
622	Binary output DOØ3	**IPOS output**	
623	Binary output DOØ4	**IPOS output**	
624	Binary output DOØ5	**IPOS output**	
63_	**Binary outputs option**		
630	Binary output DO1Ø	**No function**	
631	Binary output DO11	**No function**	
632	Binary output DO12	**No function**	
633	Binary output DO13	**No function**	
634	Binary output DO14	**No function**	
635	Binary output DO15	**No function**	
636	Binary output DO16	**No function**	
637	Binary output DO17	**No function**	
64_	**Optional analog outputs**		
640	Analog output AO1	**Actual speed**	**The following functions can be programmed:** No function • ramp input • setpoint speed • actual speed • actual frequency • output current • active current • unit utilization • IPOS output • relative torque • IPOS output 2
641	Scaling AO1	-10 – 0 – **1** – 10	
642	Operating mode AO1	OFF / **-10 – +10 V** / 0 – 20 mA / 4 – 20 mA	
643	Analog output AO2	**Output current**	
644	Scaling AO2	-10 – 0 – **1** – 10	
645	Operating mode AO2	OFF / **-10 – +10 V** / 0 – 20 mA / 4 – 20 mA	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
7__	**CONTROL FUNCTIONS**		
70_	**Operating modes**		
700	Operating mode 1	**VFC 1** VFC 1 & GROUP VFC 1 & HOIST VFC 1 & DC BRAK. VFC 1 & FLYSTART VFC-n CONTROL VFC-n-CTRL&GRP. VFC-n-CTRL&HOIST VFC-n-CTRL&SYNC VFC-n-CTRL& IPOS CFC CFC & M-CONTROL CFC&IPOS CFC&SYNC. SERVO SERVO&M-CONTROL SERVO&IPOS SERVO&SYNC.	
701	Operating mode 2	**VFC 2** VFC 2 & GROUP VFC 2 & HOIST VFC 2 & DC BRAK. VFC 2 & FLYSTART	
702	Motor category	**Rotational** Linear	
71_	**Standstill current**		
710 / 711	Standstill current 1 / 2	**0 –** 50 % I_{Mot}	
72_	**Setpoint stop function**		
720 / 723	Setpoint stop function 1 / 2	**Off** On	
721 / 724	Stop setpoint 1 / 2	0 – **30** – 500 rpm	
722 / 725	Start offset 1 / 2	0 – **30** – 500 rpm	
73_	**Brake function**		
730 / 733	Brake function 1 / 2	Off **On**	
731 / 734	Brake release time 1 / 2	**0 –** 2 s	
732 / 735	Brake application time 1 / 2	0 – 2 s	
74_	**Speed skip function**		
740 / 742	Skip window center 1 / 2	0 – **1500** – 6000 rpm	
741 / 743	Skip width 1/2	**0 –** 300 rpm	
75_	**Master/slave function**		
750	Slave setpoint	**Master/slave off** Speed (RS485) Speed (SBus) speed (485+SBus) Torque (RS485) Torque (SBus) Torque (485+SBus) Load share (RS485) Load share (SBus) Load share (485+SBus)	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
751	Scaling slave setpoint	– 10 – 0 – **1** – 10	
76_	**Manual operation**		
760	Lockout run/stop keys	**No** Yes	
77_	**Energy-saving function**		
770	Energy-saving function	**Off** On	
78_	**Ethernet configuration**		
780	IP address	000.000.000.000 – **192.168.10.x** – 223.255.255.255	
781	Subnet mask	000.000.000.000 – **255.255.255.000** – 223.255.255.255	
782	Standard gateway	**000.000.000.000** – 223.255.255.255	
783	Baud rate	Display value that cannot be changed (0 – 100 – 1000 MBaud)	
784	MAC address	Display value that cannot be changed (00-0F-69-XX-XX-XX)	
785	EtherNet/IP startup configuration	**DHCP** Saved IP parameters	
8__	**UNIT FUNCTIONS**		
80_	**Setup**		
800	User menu	**On** / off (only in DBG60B)	
801	Language	Dependent on DBG60B version	
\802	Factory setting	**No** Default Delivery state	
\803	Parameter lock	**Off** On	
804	Reset statistics data	**No** Error memory kWh counter Operating hours	
806	Copy DBG60B → MDX	Yes/**No**	Only in DBG60B
807	Copy MDX → DBG60B	Yes/**No**	Only in DBG60B
81_	**Serial communication**		
810	RS-485 address	**0 –** 99	
811	RS485 group address	**100 –** 199	
812	RS485 timeout interval	**0 –** 650 s	
819	Fieldbus timeout interval	0 – **0.5** – 650 s	
82_	**Brake operation**		
\820 / 821	4-quadrant operation 1/2	Off **On**	
83_	**Error responses**		
830	Response EXT. ERROR	**Emergency stop/malf.**	**The following fault responses can be programmed:** No response • display error • imm. stop/fault • emerg.st./fault • rapid stop/fault • rapid stop/warng. • emerg.st./warng. • rapid stop/warng.
831	Response FIELDBUS TIMEOUT	**Rapid stop/warning**	
832	Response MOTOR OVERLOAD	**Emergency stop/malf.**	
833	Response RS485 TIMEOUT	**Rapid stop/warning**	
834	LAG ERROR response	**Emergency stop/malf.**	
\835	Response TF SIGNAL	**No response**	
836 / 837	Response SBus TIMEOUT 1 / 2	**EMERG. ST/FAULT**	
838	Response SW limit switch	**Emergency stop/malf.**	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
839	Response to positioning interruption	**No response**	
84_	**Reset behavior**		
\840	Manual reset	**No** Yes	
841	Auto reset	**Off** On	
842	Restart time	1 – **3** – 30 s	
85_	**Scaling actual speed value**		
850	Scaling factor numerator	**1 –** 65535	Can only be set via MOVITOOLS® MotionStudio
851	Scaling factor denominator	**1 –** 65535	
852	User-defined unit	**rpm**	
86_	**Modulation**		
860 / 861	PWM frequency 1 / 2 VFC	2.5 kHz **4 kHz** 8 kHz 12 kHz 16 kHz	Factory setting of MOVIDRIVE® MDX61B size 7 (AC 500 V units: MDX61B1600/2000/2500) = **2.5 kHz**
862 / 863	PWM fix 1 / 2	**Off** On	
864	PWM frequency CFC	2.5 kHz **4 kHz** 8 kHz 16 kHz	Factory setting of MOVIDRIVE® MDX61B size 7 (AC 500 V units: MDX61B1600/2000/2500) = **2.5 kHz**
87_	**Process data description**		
870	Setpoint description PO1	**Control word 1**	**The following PO assignment can be set:** No function • speed current • position LO • max. speed • Max. current • slip • ramp • control word 1 • control word 2 • Speed [%] • IPOS PO DATA
871	Setpoint description PO2	**Speed**	
872	Setpoint description PO3	**No function**	
873	Actual value description PI1	**Status word 1**	**The following PI assignment can be set:** No function • speed • output current • active current • position LO • position HI • status word 1 • status word 2 • speed [%] • IPOS PI DATA • reserved • status word 3
874	Actual value description PI2	**Speed**	
875	Actual value description PI3	**Output current**	
876	PO data enable	Off **On**	
88_ / 89_	**Serial communication SBus 1 / 2**		
880 / 890	Protocol SBus 1 / 2	**SBus MOVILINK®** CANopen	
881 / 891	SBus address 1 / 2	**0** – 63	
882 / 892	SBus group address 1 / 2	**0** – 63	
883 / 893	SBus timeout interval 1 / 2	**0** – 650 s	
884 / 894	Baud rate SBus 1 / 2	125 kBd 250 kBd **500 kBd** 1000 kBd	
885 / 895	Synchronization ID SBus 1 / 2	**0** – 2047	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
886 / 896	CANopen address 1 / 2	1 – **127**	
887	Synchronization ext. Controller	**Off** On	
888	Synchronization time SBus 1/2	1 – **5** – 10 ms	
889 / 899	Parameter channel 2	Yes **No**	
9__	**IPOS PARAMETERS**		
90_	**IPOS reference travel**		
900	Reference offset	– (2^{31}– 1) – **0** – 2^{31}– 1 Inc	
901	Reference speed 1	0 – **200 –** 6000 rpm	
902	Reference speed 2	0 – **50** – 6000 rpm	
903	Reference travel type	**0 –** 8	
904	Reference travel to zero pulse	**Yes** No	
905	HIPERFACE® Offset (X15)	– (2^{31}– 1) – **0** – 2^{31}– 1 Inc	
906	Cam distance	– (2^{31}– 1) – **0** – 2^{31}– 1 Inc	
910	Gain X controller	0.1 – **0.5 –** 32	
911	Positioning ramp 1	0.01 – **1 –** 20 s	
912	Positioning ramp 2	0.01 – **1** – 20 s	
913	Travel speed CW	0 – **1500** – 6000 rpm	
914	Travel speed CCW	0 – **1500** – 6000 rpm	
915	Velocity precontrol	-199.99 – 0 – **100** – 199.99 %	
916	Ramp type	**Linear** Sine Square Bus ramp Jerk-limited Electronic cam Synchronous operation Cross cutter	
917	Ramp mode	**Mode 1** Mode 2	
918	Bus setpoint source	H0 – **H499** – H1023	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
92_	**IPOS Monitoring**		
920	SW limit switch CW	– (2^{31}– 1) ... **0** ... 2^{31}– 1 Inc	
921	SW limit switch CCW	– (2^{31}– 1) ... **0** ...2^{31}– 1 Inc	
922	Position window	0 ... **50** ... 32767 inc	
923	Lag error window	0 ... **5000** ... 2^{31}-1 inc	
924	'Position monitoring' detection	On/**off**	
93_	**IPOS Special functions**		
930	Override	On/**off**	
931	IPOS ctrl word Task 1	**Stop** / Start / Stop	Only available in DBG60B, not in MOVITOOLS® MotionStudio/SHELL.
932	IPOS ctrl word Task 2	Start / **Stop**	Only available in DBG60B, not in MOVITOOLS® MotionStudio/SHELL.
933	Jerk time	**0.005** ... 2 s	
938	IPOS speed task 1	**0** ... 9 additional commands/ms	
939	IPOS speed task 2	**0** ... 9 additional commands/ms	
94_	**IPOS Variables/encoder**		
940	IPOS variables edit	On/**off**	This parameter is only available on the DBG60B keypad, not in MOVITOOLS® MotionStudio.
941	Source actual position	**Motor encoder (X15)** Ext. encoder (X14) Absolute encoder (X62)	
942	Encoder factor numerator	**1** ... 32767	
943	Encoder factor denominator	**1** ... 32767	
944	Encoder scaling ext. Encoder	**x1**/x2/x4/x8/x16/x32/x64	With MOVITOOLS® MotionStudio only. Not visible on the DBG60B keypad.
945	Synchronous encoder type (X14)	**TTL** SIN/COS HIPERFACE®	
946	Synchronous encoder counting direction (X14)	**Normal** Inverted	
947	HIPERFACE® Offset (X14)	– (2^{31}– 1) ... **0** ...2^{31}– 1 Inc	
948	Automatic encoder replacement detection	**On**/off	
95_	**Absolute encoder**		
950	Encoder type	**No encoder**	
951	Counting direction	**Normal** Inverted	
952	Clock frequency	**1** ... 200 %	
953	Position offset	– (2^{31}– 1) ... **0** ...2^{31}– 1 Inc	
954	Zero point offset	– (2^{31}– 1) ... **0** ...2^{31}– 1 Inc	
955	Encoder scaling	**x1**/x2/x4/x8/x16/x32/x64	
956	CAN encoder baud rate		
96_	**IPOS Modulo function**		
960	Modulo function	**Off** Short Right CCW	
961	Modulo numerator	0 ... **1** ... 2^{31} – 1	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
962	Modulo denominator	0 ... **1** ... 2^{31} – 1	
963	Modulo encoder resolution	0 ... **4096** ... 20000	
97_	**IPOS synchronization**		
970	DRAM synchronization	**No** / yes	
971	Synchronization phase	–2 ... **0**...2 ms	
924	'Position monitoring' detection	On/**off**	

6 Operation

6.1 Operating displays

6.1.1 7-segment display

The 7-segment display shows the operating condition of MOVIDRIVE® and, in the event of an error, an error or warning code.

7-segment display	Unit status (high byte in status word 1)	Meaning
0	**0**	24 V operation (inverter not ready)
1	**1**	Controller inhibit active
2	**2**	No enable
3	**3**	Standstill current
4	**4**	Enable
5	**5**	n-control (speed control)
6	**6**	M-control (torque control)
7	**7**	Hold control
8	**8**	Factory setting
9	**9**	Limit switch contacted
A	**10**	Technology option
c	**12**	IPOS$^{plus®}$ reference travel
d	**13**	Flying start
E	**14**	Calibrate encoder
F	**Error number**	Error display (flashing)
H	**Status display**	Manual operation
t	**16**	Inverter is waiting for data
U	**17**	"Safe Stop" active
² (blinking dot)	-	IPOS$^{plus®}$ program is running
Flashing display	-	STOP via DBG60B
⊐1 ...⊐9	-	RAM defective

⚠ WARNING

Incorrect interpretation of display U = "Safe stop" active.

Severe or fatal injuries.

The display U = "Safe stop" is not safety-related and must not be used as a safety function.

6.1.2 DC link voltage display of size 7

	INFORMATION
	The DC link voltage display goes out about 20 seconds after the power off.

6.1.3 DBG60B keypad

Basic displays:

0.00rpm 0.000Amp CONTROLLER INHIBIT	Display when X13:1 (DIØØ "/CONTROL.INHIBIT") = "0".
0.00rpm 0.000Amp NO ENABLE	Display when X13:1 (DIØØ "/CONTROL.INHIBIT") = "1" and inverter is not enabled ("ENABLE/STOP" = "0").
950.00rpm 0.990Amp ENABLE (VFC)	Display for enabled inverter.
NOTE 6: VALUE TOO HIGH	Information message
(DEL)=Quit ERROR 9 STARTUP	Error display

6.2 Information messages

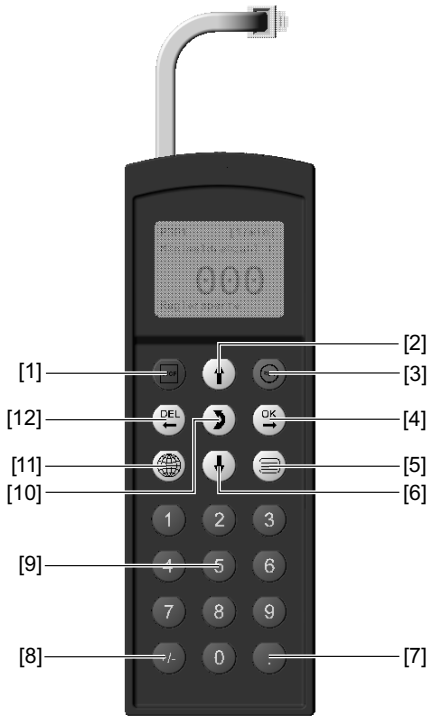
Information messages on the DBG60B (ca. 2 s in duration) or in MOVITOOLS® MotionStudio/SHELL (message that can be acknowledged):

No.	Text DBG60B/SHELL	Description
1	ILLEGAL INDEX	Index addressed via interface not available.
2	NOT IMPLEMENT.	• Attempt to execute a non-implemented function. • An incorrect communication service has been selected. • Manual operation selected via invalid interface (e.g. fieldbus).
3	READ ONLY VALUE	Attempt to edit a read-only value.
4	PARAM. INHIBITED	Parameter lock P 803 = "ON", parameter cannot be altered.
5	SETUP ACTIVE	You tried to change parameters during setup.
6	VALUE TOO HIGH	You tried to enter a value that is too high.
7	VALUE TOO LOW	You tried to enter a value that is too low.
8	REQ. CARD MISSING	The option card required for the selected function is missing.
10	ONLY VIA ST1	Manual operation must be completed using X13:ST11/ST12 (RS 485).
11	ONLY TERMINAL	Manual operation must be exited via TERMINAL (DBG60B or UWS21B).
12	NO ACCESS	Access to selected parameter denied.
13	CTRL. INHIBIT MISSING	Set terminal DIØØ "/Controller inhibit" = "0" for the selected function.
14	INVALID VALUE	You tried to enter an invalid value.
16	PARAM. NOT LOCKED	Overflow of EEPROM buffer, e.g., due to cyclic write access. Parameter not stored in non-volatile EEPROM.

No.	Text DBG60B/SHELL	Description
17	INVERTER ENABLED	• Parameter to be changed can only be set in the state "CONTROLLER INHIBIT". • Attempt to change to manual mode during enabled operation.

6.3 Functions of the DBG60B keypad

6.3.1 Key assignment for DBG60B



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[1]	Key	STOP	Stop
[2]	Key	↑	Up arrow, moves up to the next menu item
[3]	Key	RUN	Start
[4]	Key	OK	OK, confirms the entry
[5]	Key	☰	Activate the context menu
[6]	Key	↓	Down arrow, moves down to the next menu item
[7]	Key	·	Decimal point
[8]	Key	+/-	Sign reversal
[9]	Key	0 – 9	Digits 0... 9
[10]	Key		Change menu
[11]	Key		Select language
[12]	Key	DEL	Delete previous entry

6.3.2 Copy function of the DBG60B

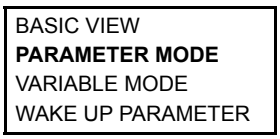
The DBG60B keypad can be used for copying complete parameter sets from one MOVIDRIVE® unit to other MOVIDRIVE® units. Proceed as follows:

- In the context menu, select the menu item "COPY TO DBG". Confirm the setting by pressing the OK key.
- After the copying process has finished, plug the keypad in the other inverter.
- In the context menu, select the menu item "COPY TO MDX". Confirm the setting by pressing the OK key.

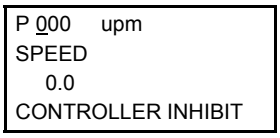
6.3.3 Parameter mode

Proceed as follows to set the parameters in parameter mode:

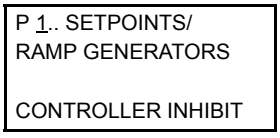
1. Activate the context menu by pressing the ☰ key.



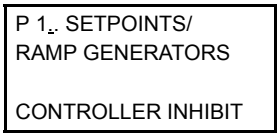
2. Press the OK key to start the PARAMETER MODE. The first display parameter P000 "SPEED" appears. Press the ↑ key or ↓ key to select the main parameter groups 0 to 9.



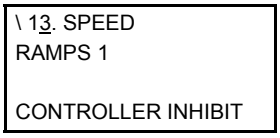
3. Press the ↑ key or ↓ key to select the required main parameter group. The flashing cursor is positioned under the number of the main parameter group.



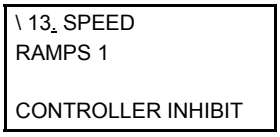
4. Activate parameter subgroup selection in the main parameter group by pressing the OK key. The flashing cursor moves one position to the right.



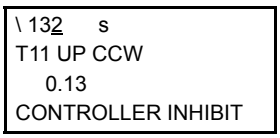
5. Press the ↑ key or ↓ key to select the required parameter subgroup. The flashing cursor is positioned under the number of the parameter subgroup.



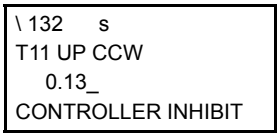
6. Activate parameter selection in the required parameter subgroup by pressing the OK key. The flashing cursor moves one position to the right.



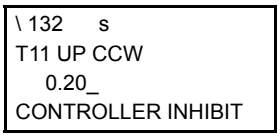
7. Press the ↑ key or ↓ key to select the desired parameter. The flashing cursor is positioned under the third digit of the parameter number.



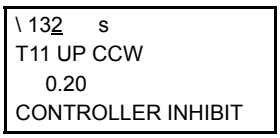
8. Press the OK key to activate the setting mode for the selected parameter. The cursor is positioned under the parameter value.



9. Press the ↑ key or ↓ key to select the desired parameter value.



10. Confirm the setting by pressing the OK key. Exit the setting mode by pressing the ↩ key. The flashing cursor is positioned under the third digit of the parameter number again.



11. Press the ↑ key or ↓ key to select another parameter or go back to the parameter subgroup menu using the DEL key.

\ 13. SPEED RAMPS 1
CONTROLLER INHIBIT

12. Press the ↑ key or ↓ key to select another parameter subgroup or go back to the main parameter group menu using the DEL key.

P 1.. SETPOINTS/ RAMP GENERATORS
CONTROLLER INHIBIT

13. Press the ☰ key to return to the context menu.

BASIC VIEW
PARAMETER MODE
VARIABLE MODE
WAKE UP PARAMETER

6.3.4 Variable mode

H... variables are displayed in the variable mode. To call up the variable mode, proceed as follows:

- Use the ☰ key to call up the context menu. Select the "VARIABLE MODE" menu item and confirm with the OK key. The variable mode display appears.
- You can use the ↻ key to edit the variables.

6.3.5 User menu

The DBG60B keypad has a standard user menu containing the parameters that are used most often. The parameters in the user menu are displayed with a "\" before the parameter number (→ Sec. "Complete parameter list"). You can add or delete parameters. You can save a maximum of 50 parameter entries. The parameters are displayed in the order in which they are stored in the inverter. The parameters are not sorted automatically.

- Use the ☰ key to call up the context menu. Select the menu item "USER MENU" and press the OK key to confirm. The user menu with the most frequently used parameters appears.

Adding parameters to the user menu

Proceed in this order to add parameters to the user menu:

- Use the ☰ key to call up the context menu. Select the "PARAMETER MODE" menu item.
- Choose the parameter you require and confirm your entry using the OK key.
- Press the ☰ key to return to the context menu. In the context menu, select the menu item "ADD Pxxx". "xxx" is the parameter you selected previously. Confirm the setting by pressing the OK key. The selected parameter is stored in the user menu.

Deleting parameters from the user menu

Proceed in this order to delete parameters from the user menu:

- Use the ☰ key to call up the context menu. Select the menu item "USER MENU".
- Select the parameter that is to be deleted. Confirm the setting by pressing the OK key.
- Press the ☰ key to return to the context menu. In the context menu, select the menu item "DELETE Pxxx". "xxx" is the parameter you selected previously. Confirm the setting by pressing the OK key. The selected parameter is deleted from the user menu.

6.3.6 Wake-up parameter

The wake-up parameter is the parameter that is displayed when the DBG60B is switched on. The factory setting for the wake up parameter is the basic display. You can select which parameter should be the wake-up parameter. The following options can be used as the wake-up parameter:

- Parameter (→ parameter mode)
- Parameter from the user menu (→ user menu)
- H variable (→ variable mode)
- Basic display

Proceed as follows to save a wake-up parameter:

- First select the required parameter in parameter mode.
- In the context menu, select the menu item "XXXX INITIAL PARAM.". "XXXX" is the selected initial parameter. Confirm the setting by pressing the OK key.

6.3.7 IPOS$^{plus®}$

MOVITOOLS® MotionStudio is required for programming IPOS$^{plus®}$. You can only use the DBG60B keypad to edit or change IPOS$^{plus®}$ variables (H__).

The IPOS$^{plus®}$ program is also stored in the DBG60B keypad when it is saved and is consequently also transferred when the parameter set is copied to another MOVIDRIVE® unit.

Parameter P931 can be used for starting and stopping the IPOS$^{plus®}$ program from the DBG60B keypad.

6.4 Memory card

The pluggable memory card is installed in the basic unit. The basic data is stored on the memory card and is always up-to-date. If a unit has to be replaced, the plant can be started up again quickly without PC and data backup by simply re-plugging the memory card. You can install as many option cards as required.

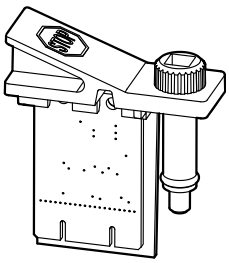


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Fig. 34: MDX60B/61B memory card

6.4.1 Notes for replacing the memory card

- Only plug in the memory card when the MOVIDRIVE® B unit is switched off.
- You can install the memory card from the original unit in a new inverter. The following combinations are permitted:

Original unit MOVIDRIVE® MDX60B/61B...	New inverter MOVIDRIVE® MDX60B/61B...
00	00 or 0T
0T	0T

- The same options that were available in the original unit must be installed in the new inverter.

  If this is not the case, the error message "79 HW configuration" (hardware configuration) is displayed. You can remedy the error by calling up the "DELIVERY CONDITION" menu item from the context menu (P802 factory setting). This resets the unit to its initial delivery condition. You must then restart the unit.
- The counter status of the DRS11B option and the data of the DH..1B and DCS..B options are not stored on the memory card. When you replace the memory card, you have to install the DRS11B, DH..1B and DCS..B option cards from the original unit in the new inverter.

  If the original unit was a MOVIDRIVE® B size 0 unit with the option DHP11, you have to use a new DHP11B option card with the configuration data set (file name.sewcopy) that you saved previously.
- If an absolute encoder is used as a motor or synchronous encoder, you must reference the encoder after you have replaced the unit.
- When replacing an absolute encoder, you have to reference it again.

7 Service

7.1 Error information

7.1.1 Error memory

The fault memory (P080) stores the last five error messages (errors t-0...t-4). The oldest error message is deleted whenever more than five error messages have occurred. The following information is stored when a malfunction occurs:

Error that has occurred · Status of binary inputs/outputs · Operating status of the inverter · Inverter status · Heat sink temperature · Speed · Output current · Active current · Unit utilization · DC link voltage · ON hours · Enable hours · Parameter set · Motor utilization.

7.1.2 Switch-off responses

There are three switch-off responses depending on the fault; the inverter remains inhibited in fault status:

Immediate disconnection The unit can no longer brake the drive; the output stage goes to high resistance in the event of a fault and the brake is applied immediately (DBØØ “/Brake” = “0”).

Rapid stop The drive is braked with the stop ramp t13/t23. Once the stop speed is reached, the brake is applied (DBØØ "/Brake" = "0"). The output stage goes to high resistance after the brake reaction time has elapsed (P732 / P735).

Emergency stop The drive is braked with the emergency ramp t14/t24. Once the stop speed is reached, the brake is applied (DBØØ "/Brake" = "0"). The output stage goes to high resistance after the brake reaction time has elapsed (P732 / P735).

7.1.3 Reset

An error message can be acknowledged by:

- Switching the supply system off and on again

  Recommendation: Observe a minimum switch-off time of 10 s for the supply system contactor K11.
- Reset via input terminals; that is, via an appropriately assigned binary input (DIØ1 to DIØ7 with the basic unit, DI1Ø to DI17 with the DIO11B option).
- Manual reset in SHELL (P840 = “YES” or [Parameter] / [Manual reset]).
- Manual reset using the DBG60B.
- Auto reset performs up to five unit resets with an adjustable restart time.

⚠ DANGER

Risk of crushing if the motor starts up automatically after an auto reset.

Severe or fatal injuries.

- Do not use auto reset with drives where an automatic restart represents a danger to people or units.
- Perform a manual reset.

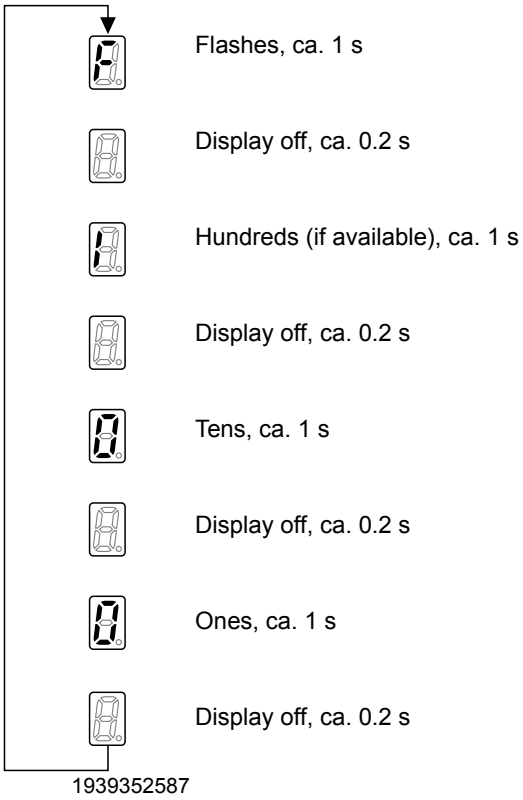
7.1.4 Inverter is waiting for data

If the inverter is controlled via a communication interface (fieldbus, RS485 or SBus) and the power was switched off and back on again or a fault reset was performed, then the enable remains ineffective until the inverter receives valid data again via the interface, which is monitored with a timeout.

7.2 Error messages and list of errors

7.2.1 Error message via 7-segment display

The fault code is shown in a 7-segment display. The following display sequence is used (e.g. fault code 100):


Flashes, ca. 1 s
Display off, ca. 0.2 s
Hundreds (if available), ca. 1 s
Display off, ca. 0.2 s
Tens, ca. 1 s
Display off, ca. 0.2 s
Ones, ca. 1 s
Display off, ca. 0.2 s
1939352587

Following a reset or if the error code resumes the value "0", the display switches to the operating display.

7.2.2 Suberror code – display

The suberror code is displayed in MOVITOOLS® MotionStudio (version 4.50 and higher) or in the DBG60B keypad.

7.2.3 Error list

The factory set error response is listed in the "Response P" column. (P) indicates that the response is programmable (via *P83_error response* or with IPOS$^{plus®}$). In the event of error 108, (P) indicates that the response can be programmed via *P555 DCS error response* In the event of error 109, (P) indicates that the response can be programmed via *P556 DCS alarm response*

Error			Suberror			
Code	**Designation**	**Response (P)**	**Code**	**Designation**	**Possible cause**	**Measure**
00	No error					
01	Overcurrent	Immediate disconnection	0	Output stage	• Short circuit at output • Motor too large • Defective output stage • Power supply Current converters • Ramp limit is deactivated and set ramp time is too short • Defective phase module • Supply voltage 24 V or 24V generated from it is instable • Interruption or short circuit on the signal lines from the phase modules	• Rectify the short circuit • Connect a smaller motor • Contact SEW Service for advice if the output stage is defective. • Activate P138 and/or increase ramp time
			1	V_{CE} monitoring or undervoltage monitoring of the gate driver		
			5	Inverter remains in hardware current limit		
			6	V_{CE} monitoring or undervoltage monitoring of the gate driver or overcurrent of the current converter. ..Phase U		
			7	..Phase V		
			8	..Phase W		
			9	..Phase U and V		
			10	..Phase U and W		
			11	..Phase V and W		
			12	..Phase U and V and W		
			13	Voltage supply Current converter in status mains operation		
			14	MFE signal lines		
03	Ground fault	Immediate disconnection	0	Ground fault	Ground fault • in the motor lead • in the inverter • in the motor	• Eliminate ground fault • Consult SEW Service
04	Brake chopper	Immediate disconnection	0	DC link voltage too high in 4Q operation	• Too much regenerative power • Braking resistor circuit interrupted • Short circuit in the braking resistor circuit • Brake resistance too high • Brake chopper is defective	• Extend deceleration ramps • Check supply cable to braking resistor • Check technical data of braking resistor • Replace MOVIDRIVE® if the brake chopper is defective
			1			
06	Mains phase failure	Immediate disconnection	0	DC link voltage periodically too low	• Phase failure • Inadequate line voltage quality	• Check the line cable • Check configuration of the supply system. • Check supply (fuses, contactor)
			3	Line frequency fault		
			4	-		
07	DC link overvoltage	Immediate disconnection	0	DC link voltage too high in 2Q operation	DC link voltage too high	• Extend deceleration ramps • Check supply cable to the braking resistor • Check technical data of braking resistor
			1			
			2	DC link voltage too high in 4Q operation .. .. Phase U		
			3	.. Phase V		
			4	.. Phase W		

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
08	Speed monitoring	Immediate disconnection (P)	0	Inverter in current limit or in slip limit	• Speed controller or current controller (in VFC operating mode without encoder) operating at setting limit due to mechanical overload or phase failure in the power supply or motor. • Encoder not connected correctly or incorrect direction of rotation. • n_{max} is exceeded during torque control. • In operating mode VFC: Output frequency ≥ 150 Hz • In operating mode V/f: Output frequency ≥ 600 Hz	• Reduce load • Increase deceleration time (P501 or P503). • Check encoder connection, swap A/A and B/B pairs if necessary • Check encoder voltage supply • Check current limitation • Extend ramps if necessary • Check motor cable and motor • Check mains phases
			3	"Actual speed" system limit exceeded. Speed difference between ramp setpoint and actual value for 2×ramp time higher than expected slip.		
			4	Maximum rotating field speed exceeded. Maximum rotating field frequency (with VFC max 150 Hz and V/f max 600 Hz) exceeded.		
09	Startup	Immediate disconnection	0	Startup missing	Inverter has not been started up for the selected operating mode.	Perform startup for the required operating mode.
			1	Wrong operating mode selected		
			2	Wrong encoder type or defective encoder card		
10	IPOS-ILLOP	Emergency stop	0	Invalid IPOS command	• Incorrect command detected during IPOS$^{plus®}$ program execution. • Incorrect conditions during command execution.	• Check the content of the program memory and, if necessary, correct. • Load the correct program into the program memory. • Check program sequence (→ IPOS$^{plus®}$ manual)
11	Overtemperature	Emergency stop (P)	0	Heat sink temperature too high or temperature sensor defective	• Thermal overload of inverter • Temperature sensor of a phase module faulty. (size 7)	• Reduce load and/or ensure adequate cooling. • Check fan. • If F-11 is issued even though the temperatures is obviously not too high, this indicates a faulty temperature sensor of the phase module. Replace the phase module (Size 7)
			3	Overtemperature switched-mode power supply		
			6	Heat sink temperature too high or temperature sensor defective. ..Phase U		
			7	..Phase V		
			8	..Phase W (size 7)		
13	Control signal source	Immediate disconnection	0	Control signal source not available, e.g. control signal source fieldbus without fieldbus card	Control signal source not defined or defined incorrectly.	Set correct control signal source (P101).

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
14	Encoder	Immediate disconnection	0	Encoder not connected, defective encoder, defective encoder cable	• Encoder cable or shield not connected correctly • Short circuit/broken encoder wire • Encoder defective	Check encoder cable and shield for correct connection, short circuit and broken wire.
			25	Encoder error X15 - Speed range exceeded. Encoder at X15 turns faster than 6542 rpm.		
			26	Encoder error X15 - Card is defective. Error in the quadrant evaluation.		
			27	Encoder error – encoder connection or encoder is defective		
			28	Encoder error X15 - Communication error RS485 channel.		
			29	Encoder error X14 - Communication error RS485 channel.		
			30	Unknown encoder type at X14/X15		
			31	Plausibility check fault X14/X15 Increments have been lost.		
			32	Encoder error X15 Hiperface®. Hiperface® encoder at X15 reports error.		
			33	Encoder error X14 Hiperface®. Hiperface® encoder at X14 reports error.		
			34	Encoder error X15 resolver. Encoder connection or encoder is defective.		
17	System malfunction	Immediate disconnection	0	"Stack overflow" error	Inverter electronics disrupted, possibly due to effect of EMC.	• Check grounding and shielding and improve, if necessary. • Consult SEW service if the error reoccurs.
18			0	"Stack underflow" error		
19			0	Fault "External NMI"		
20			0	Fault "Undefined opcode"		
21			0	"Protection fault" error		
22			0	"Illegal word operand access" error		
23			0	"Illegal instruction access" error		
24			0	"Illegal external bus access" error		
25	EEPROM	Rapid stop	0	Read or write error on EEPROM power section	Access to the EEPROM of the memory card has failed	• Activate factory settings, perform reset and reset parameters. • Contact SEW service if the error occurs again. • Replace memory card.
			11	NV memory read error NV-RAM inside the unit		
			13	NV memory chip card System module defective		
			14	NV memory chip card Memory card defective		
			16	NV memory initialization error		
26	External terminal	Emergency stop (P)	0	External terminal	Read in external error signal via programmable input.	Eliminate respective cause; reprogram terminal if necessary.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
27	No limit switches	Emergency stop	0	Both limit switches missing or open circuit	• Open circuit/both limit switches missing. • Limit switches are swapped over in relation to direction of rotation of motor	• Check wiring of limit switches. • Swap over limit switch connections. • Reprogram terminals
			2	Limit switch reversed		
			3	Both limit switches are active simultaneously		
28	Fieldbus Timeout	Rapid stop (P)	0	Fault "Fieldbus timeout"	No communication between master and slave within the projected response monitoring.	• Check communications routine of the master • Extend fieldbus timeout time (P819) or deactivate monitoring
			2	Fieldbus card does not boot		
29	Limit switch contacted	Emergency stop	0	Hardware limit switch approached	A limit switch was reached in IPOS$^{plus®}$ operating mode.	• Check travel range. • Correct user program.
30	Emergency stop Timeout	Immediate disconnection	0	Time violation stop emergency stop rate	• Drive overloaded • Emergency stop ramp too short.	• Check configuration • Extend emergency stop ramp
31	TF/TH sensor tripped	No response (P)	0	Thermal motor protection error	• Motor too hot, TF/TH has triggered • TF/TH of the motor not connected or connected incorrectly • MOVIDRIVE® connection and TF/TH connection on motor interrupted	• Let motor cool off and reset error • Check connections/link between MOVIDRIVE® and TF/TH. • If a TF/TH is not connected: Jumper X10:1 with X10:2. • Set P835 to "No response".
32	IPOS index overflow	Emergency stop	0	IPOS program defective	Programming principles violated leading to system internal stack overflow	Check and correct the IPOS$^{plus®}$ user program (see IPOS$^{plus®}$ manual).
33	Setpoint source	Immediate disconnection	0	Setpoint source not available, e.g. control signal source fieldbus without fieldbus card	Setpoint source not defined or defined incorrectly.	Set correct setpoint source (P100).
34	Ramp Timeout	Immediate disconnection	0	Time violation rapid stop ramp	Time of downward ramps exceeded, e.g. due to overload.	• Extend the downwards ramps • Eliminate overload
35	Operating mode	Immediate disconnection	0	Operating mode not available	• Operating mode not defined or defined incorrectly • P916 was used to set a ramp function that is needed by a MOVIDRIVE® unit in technology version. • P916 was used to set a ramp type that does not match the selected technology function. • P916 was used to set a ramp type that does not match the selected synchronization time (P888).	• Use P700 or P701 to set correct operating mode. • Use MOVIDRIVE® in technology version (..OT). • From the "Startup → Select technology function..." menu, select the technology function that matches P916. • Check the settings of P916 and P888
			1	Wrong assignment operating mode - hardware		
			2	Wrong assignment operating mode - technology function		
36	Option missing	Immediate disconnection	0	Hardware is missing or not permitted.	• Type of option card not allowed • Setpoint source, control signal source or operating mode not permitted for this option card • Incorrect encoder type set for DIP11B.	• Use correct option card • Set correct setpoint source (P100) • Set correct control signal source (P101) • Set correct operating mode (P700 or P701) • Set the correct encoder type
			2	Encoder slot error.		
			3	Fieldbus slot error.		
			4	Expansion slot error.		
37	System watchdog	Immediate disconnection	0	Error "watchdog overflow system"	Error while executing system software	Consult SEW Service.
38	System software	Immediate disconnection	0	"System software" error	System malfunction	Consult SEW Service.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
39	Reference travel	Immediate disconnection (P)	0	"Reference travel" error	• The reference cam is missing or does not switch • Limit switches are connected incorrectly • Reference travel type was changed during reference travel	• Check reference cam • Check limit switch connection • Check reference travel type setting and required parameters.
40	Boot synchronization	Immediate disconnection	0	Timeout at boot synchronization with option.	• Error during boot synchronization between inverter and option. • Synchronization ID not/ incorrectly transmitted	Install a new option card if this error reoccurs.
41	Watchdog option	Immediate disconnection	0	Error – Watchdog timer from/to option.	• Error in communication between system software and option software • Watchdog in the IPOS$^{plus®}$ program • An application module without the application version has been loaded in a MOVIDRIVE® B unit • The wrong technology function has been set if an application module is used	• Consult SEW Service. • Check IPOS program • Check whether the unit has been activated for the application version (P079) • Check the selected technology function (P078)
			17	Watchdog IPOS error.		
42	Lag error	Immediate disconnection (P)	0	Positioning lag error	• Encoder connected incorrectly • Acceleration ramps too short • P component of positioning controller too small • Incorrectly set speed controller parameters • Value of lag error tolerance too small	• Check encoder connection • Extend ramps • Set P component to higher value • Reset speed controller parameters • Increase lag error tolerance • Check wiring of encoder, motor and mains phase. • Check whether mechanical system components can move freely or if they are blocked
43	RS485-Timeout	Rapid stop (P)	0	Communication timeout at RS485 interface.	Error during communication via interface RS485	Check RS485 connection (e.g. inverter - PC, inverter - DBG60B). If necessary, contact SEW Service.
44	Unit utilization	Immediate disconnection	0	Unit utilization error	• Unit utilization (IxT value) > 125%	• Decrease power output • Extend ramps • If suggested actions not possible, use larger inverter. • Reduce load
			8	UL monitoring error		
45	Initialization	Immediate disconnection	0	General error during initialization	• No parameters set for EEPROM in power section, or parameters set incorrectly. • Option card not in contact with backplane bus.	• Restore factory settings Consult SEW Service if the error still cannot be reset. • Insert the option card correctly.
			3	Data bus error during RAM check		
			6	CPU clock error.		
			7	Error in the current evaluation.		
			10	Error setting the flash protection		
			11	Data bus error during RAM check		
			12	Parameter setting error synchronous operation (internal synchronous operation)		

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
46	System bus 2 timeout	Rapid stop (P)	0	Timeout system bus CAN2	Error during communication via system bus 2.	Check system bus connection.
47	System bus 1 timeout	Rapid stop (P)	0	Timeout system bus CAN1	Error during communication via system bus 1.	Check system bus connection.
48	Hardware DRS	Immediate disconnection	0	Hardware synchronous operation	**Only with DRS11B:** • Encoder signal from master/ synchronous encoder faulty. • Hardware required for synchronous operation is faulty.	• Check encoder signals of master/synchronous encoder. • Check encoder wiring. • Replace synchronous operation card.
77	IPOS control word	No response (P)	0	Invalid control word IPOS	**Only in IPOS$^{plus®}$ operating mode:** • An attempt was made to set an invalid automatic mode (via external controller). • P916 = BUS RAMP is set.	• Check serial connection to external control. • Check write values of external control. • Set correct value for P016.
78	IPOS SW limit switch	No response (P)	0	Software limit switch reached	**Only in IPOS$^{plus®}$ operating mode:** Programmed target position is outside travel range delimited by software limit switches.	• Check the user program • Check position of the software limit switches
79	Hardware configuration	Immediate disconnection	0	Deviating hardware configuration when replacing the memory card	The following items do not match anymore after having replaced the memory card: • Power • Rated voltage • Variant identification • Unit series • Application or standard version • Option cards	Ensure identical hardware or restore factory setting (parameter = factory setting).
80	RAM test	Immediate disconnection	0	"RAM test" error	Internal unit fault, RAM defective.	Consult SEW Service.
81	Start condition	Immediate disconnection	0	Start condition error with VFC hoist	**Only in "VFC hoist" operating mode:** The motor could not be supplied with the correct amount of current during the pre-magnetizing time: • Rated motor power too small in relation to rated inverter power. • Motor cable cross section too small. **Only for operation with a linear motor (as of firmware 18):** • The drive has been set to "Enable" although the commutation offset between linear motor and linear encoder is not known. This means that the inverter cannot set the current indicator correctly.	• Check startup data and perform new startup, if necessary. • Check connection between inverter and motor. • Check cross section of motor cable and increase if necessary. • Perform commutation travel in the "No enable" state and then switch to "Enable" once the inverter has acknowledged in status word bit 25 that commutation was successful.
82	Open output	Immediate disconnection	0	Output open with VFC hoist	**Only in "VFC hoist" operating mode:** • Two or all output phases interrupted. • Rated motor power too small in relation to rated inverter power.	• Check connection between inverter and motor. • Check startup data and perform new startup, if necessary.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
84	Motor protection	Emergency stop (P)	0	"Motor temperature simulation" error	• Motor utilization too high. • I_N-U_L monitoring 1 triggered • P530 set later to "KTY"	• Reduce load. • Extend ramps. • Observe longer pause times. • Check P345/346 • Select a larger motor
			2	Short circuit or open circuit in the temperature sensor		
			3	No thermal motor model available		
			4	UL monitoring error		
86	Memory module	Immediate disconnection	0	Error in connection with memory module	• No memory card • Memory card defective	• Tighten knurled screw • Insert and secure memory card • Replace memory card
			2	Hardware card detection wrong memory card		
87	Technology function	Immediate disconnection	0	Technology function selected with standard unit	A technology function was activated in a standard version.	Disable technology function
88	Flying start	Immediate disconnection	0	"Flying start" error	**Only in VFC n-CTRL operating mode:** Actual speed > 6000 rpm with the inverter enabled.	Inverter not enabled before actual speed is ≤ 6000 rpm.
92	DIP encoder problem	Error display (P)	1	Stahl WCS3 dirt problem	Encoder signals an error	Possible cause: Encoder is dirty → clean encoder
93	DIP encoder error	Emergency stop (P)	0	Fault "Absolute encoder"	The encoder signals an error, e.g. power failure. • Connection cable between the encoder and DIP11B does not meet the requirements (twisted pair, shielded). • Cycle frequency for cable length too high. • Permitted max. speed/ acceleration of encoder exceeded. • Encoder defective.	• Check absolute encoder connection. • Check connection cables. • Set correct cycle frequency. • Reduce maximum traveling velocity or ramp. • Replace absolute encoder.
94	EEPROM checksum	Immediate shut-off	0	Power section parameters	Inverter electronics disrupted, possibly due to effect of EMC or a defect.	Send unit in for repair.
			5	Control unit data		
			6	Power section data		
			7	Invalid version of the configuration data set		
95	DIP plausibility error	Emergency stop (P)	0	Validity check of absolute position	No plausible position could be determined. • Incorrect encoder type set. • IPOS$^{plus®}$ travel parameter set incorrectly. • Numerator/denominator factor set incorrectly. • Zero adjustment performed. • Encoder defective.	• Set the correct encoder type. • Check IPOS$^{plus®}$ travel parameters. • Check traveling velocity. • Correct numerator/ denominator factor. • After zero adjustment reset. • Replace absolute encoder.
97	Copy error	Immediate disconnection	0	Parameter set upload is/ was faulty	• Memory card cannot be written or read. • Error during data transmission	• Repeat copying process • Restore default setting (P802) and repeat copying process
			1	Download of parameter set to unit cancelled.		
			2	Not possible to adopt parameters. Not possible to adopt parameters from memory card.		
98	CRC error	Immediate disconnection	0	"CRC via internal flash" error	Internal unit error Flash memory defective	Send unit in for repair.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
99	IPOS ramp calculation	Immediate disconnection	0	"Ramp calculation" error	**Only in IPOS$^{plus®}$ operating mode:** Positioning ramp is sinusoidal or square and an attempt is made to change ramp times and traveling velocities with enabled inverter.	Rewrite the IPOS$^{plus®}$ program so that ramp times and traveling velocities can only be altered when the inverter is inhibited.
100	Vibration warning	Display error (P)	0	Vibrations diagnostics warning	Vibration sensor warning (→ "DUV10A" operating instructions).	Determine cause of vibrations. Continue operation until F101 occurs.
101	Vibration error	Rapid stop (P)	0	Vibration diagnostics error	Vibration sensor reports error.	SEW-EURODRIVE recommends that you remedy the cause of the vibrations immediately
102	Oil aging warning	Display error (P)	0	Oil aging warning	Error message from the oil aging sensor	Schedule oil change.
103	Oil aging error	Display error (P)	0	Oil aging error	Error message from the oil aging sensor	SEW-EURODRIVE recommends that you change the gear unit oil immediately.
104	Oil aging overtemperature	Display error (P)	0	Oil aging overtemperature	Overtemperature signal from the oil aging sensor	• Let oil cool down • Check if the gear unit cools properly
105	Oil aging ready signal	Display error (P)	0	Oil aging ready signal	Oil aging sensor is not ready for operation	• Check voltage supply of oil aging sensor • Check and, if necessary, replace the oil aging sensor
106	Brake wear	Display error (P)	0	Brake wear error	Brake lining worn	Replace brake lining (→ "Motors" operating instructions).
107	Line components	Immediate disconnection	1	No feedback signal from main contactor.	Defective main contactor	• Check main contactor • Check control cables.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS error	Immediate stop/malfunction (P)	0	DCS error		
			1	Error during transfer of configuration data to the monitoring unit.	Interruption in connection during program download	Send the configuration files again
			2	Configuration data for software version of the subassembly is invalid.	Subassembly configured with incorrect software version of the programming interface.	Configure subassembly with permitted version of the programming interface. Then switch subassembly off and on again.
			3	Unit was programmed with incorrect programming interface.	Program or configuration data was loaded into the unit with an incorrect programming interface.	Check the design of the subassembly. Configure again with a valid programming interface. Then switch the unit off and on again.
			4	Faulty reference voltage.	• Supply voltage of the subassembly is defective. • Faulty component in the subassembly	• Check supply voltage • Switch unit off and on again
			5			
			6	Faulty system voltage.		
			7			
			8	Faulty test voltage		
			9			
			10	Faulty DC 24 V voltage supply		
			11	Ambient temperature of the unit is not in the defined range.	Temperature at the place of operation is not in the permitted range.	Check the ambient temperature.
			12	Plausibility error for position changeover	For the position changeover, ZSC, JSS or DMC is permanently activated.	• Check ZSC activation • Check JSS activation • Check DMC activation (only for monitoring via position)
			13	Faulty switching of the LOSIDE driver DO02_P / DO02_M	Short circuit of the output.	Check wiring at the output.
			14	Faulty switching of the HISIDE driver DO02_P / DO02_M		
			15	Faulty switching of the LOSIDE driver DO0_M		
			16	Faulty switching of the HISIDE driver DO0_P		
			17	Faulty switching of the LOSIDE driver DO01_M		
			18	Faulty switching of the HISIDE driver DO01_P		

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Rapid stop/ warning (P)	0	DCS alarm		
			1	Communication error at the CAN interface of the inverter.	The DCS21B/31B option does not receive any valid data from the inverter.	• Check hardware connection to the inverter • Check version of the inverter
			2 3	Plausibility error digital input at pulse P1	No pulse1 voltage present at binary input DI1	• Check configuration of the DI1 binary input according to configuration and wiring diagram • Check the wiring
			4 5	Plausibility error digital input at pulse P2		• Check configuration of the DI2 binary input according to configuration and wiring diagram • Check the wiring
			6 7	Pulse 1 plausibility error at binary input DI3		• Check configuration of the DI3 binary input according to configuration and wiring diagram • Check the wiring
			8 9	Pulse 1 plausibility error at binary input DI4		• Check configuration of the DI4 binary input according to configuration and wiring diagram • Check the wiring
			10 11	Pulse 1 plausibility error at binary input DI5		• Check configuration of the DI5 binary input according to configuration and wiring diagram • Check the wiring
			12 13	Pulse 1 plausibility error at binary input DI6		• Check configuration of the DI6 binary input according to configuration and wiring diagram • Check the wiring
			14 15	Pulse 1 plausibility error at binary input DI7		• Check configuration of the DI7 binary input according to configuration and wiring diagram • Check the wiring
			16 17	Pulse 1 plausibility error at binary input DI8		• Check configuration of the DI8 binary input according to configuration and wiring diagram • Check the wiring

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Rapid stop/ warning (P)	18 19	Pulse 2 plausibility error at binary input DI1	No pulse 2 voltage present at binary input DI1.	• Check configuration of the DI1 binary input according to configuration and wiring diagram • Check the wiring
			20 21	Pulse 2 plausibility error at binary input DI2		• Check configuration of the DI2 binary input according to configuration and wiring diagram • Check the wiring
			22 23	Pulse 2 plausibility error at binary input DI3		• Check configuration of the DI3 binary input according to configuration and wiring diagram • Check the wiring
			24 25	Pulse 2 plausibility error at binary input DI4		• Check configuration of the DI4 binary input according to configuration and wiring diagram • Check the wiring
			26 27	Pulse 2 plausibility error at binary input DI5		• Check configuration of the DI5 binary input according to configuration and wiring diagram • Check the wiring
			28 29	Pulse 2 plausibility error at binary input DI6		• Check configuration of the DI6 binary input according to configuration and wiring diagram • Check the wiring
			30 31	Pulse 2 plausibility error at binary input DI7		• Check configuration of the DI7 binary input according to configuration and wiring diagram • Check the wiring
			32 33	Pulse 2 plausibility error at binary input DI8		• Check configuration of the DI8 binary input according to configuration and wiring diagram • Check the wiring
			34 35	Plausibility error in the speed recording	The difference between the two velocity sensors is higher than the configured speed cut-off threshold.	• Check track again with the data of the encoder configuration. • Check the velocity sensor • Use the SCOPE function to set speed signals so that they are congruent
			36 37	Plausibility error in the position acquisition	The difference between the two position sensors is higher than the configured value.	• Check track with the configured data of the encoder setting • Check position signal • Are all signals connected correctly to the 9-pin encoder connector? • Check the encoder connector for correct wiring. Is the jumper between pin 1 and pin 2 on the 9-pin encoder connector closed (SSI absolute encoder)? • Use the SCOPE function to set positions signals so that they are congruent

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Rapid stop/ warning (P)	38 39	Plausibility error incorrect position range	The current position is outside the configured range.	• Check track with the configured data of the encoder setting • Check position signal, correct offset if necessary • Use the SCOPE function to read off the position and set in ratio to the configured values
			40 41	Plausibility error incorrect speed.	The current velocity exceeds the configured maximum velocity.	• The drive moves outside the permitted and configured velocity range • Check configuration (set max. velocity) • Analyze the velocity development using the SCOPE function
			42 43	Configuration error: Acceleration	The current acceleration is outside the configured acceleration range.	• Check encoder type and configuration (SSI/ incremental) • Check the encoder connection/wiring • Check polarity of the encoder data • Check function of the encoder
			44 45	Plausibility error in encoder interface (A3401 = encoder 1 and A3402 = encoder 2).	The wiring of the encoder does not correspond to the configured data.	• Check encoder type and configuration (SSI/ incremental) • Check the encoder connection/wiring • Check polarity of the encoder data • Check function of the encoder
			46 47	Encoder supply voltage error (A3403 = encoder 1 and A3404 = encoder 2)	Encoder voltage supply is outside the defined range (min. DC 20 V / max. DC 29 V).	• Overload in the supply voltage of the encoder; internal fuse has triggered • Check supply voltage of the DCS21B/31B option
			48 49	Reference voltage error	The reference voltage input of the encoder system is outside the defined range.	Check reference voltage input of the encoder system.
			50 51	Difference level RS485 driver 1 (error INC_B or SSI_CLK) faulty	No encoder connection, incorrect encoder type.	Check the encoder connection.
			52 53	Difference level RS485 driver 2 (error INC_A or SSI_DATA) faulty.		
			54 55	Incremental counter deviation		
			56 57	Plausibility error in encoder interface (A3401 = encoder 1 and A3402 = encoder 2)	The wiring of the encoder does not correspond to the configured data.	• Check encoder type and configuration (SSI/ incremental) • Check the encoder connection/wiring • Check polarity of the encoder data • Check function of the encoder

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Rapid stop/ warning (P)	58	Plausibility error SIN/COS encoder connection.	Incorrect encoder type connected.	• Check the encoder connection • Check the encoder connection (jumper between pin 1 and pin2)
			59			
			60	Plausibility error incremental encoder connection		
			61			
			62		Phase error of the incremental or sin/cos encoder.	• Check the encoder connection • Replace the defective encoder
			63			
			64	Plausibility error - SSI encoder connection.	Connected encoder type does not correspond to the configuration.	• Check the encoder connection • Check connected encoder
			65			
			66	Plausibility error - SSI listener encoder connection		
			67			
			68	Faulty switching of the LOSIDE driver DO2_M	DC 0 V short circuit at the output.	Check wiring at the output.
			69	Faulty switching of the HISIDE driver DO2_P		
			70	Faulty switching of the LOSIDE driver DO0_M		
			71	Faulty switching of the HISIDE driver DO0_P		
			72	Faulty switching of the LOSIDE driver DO1_M		
			73	Faulty switching of the HISIDE driver DO1_P		
			74	Undervoltage test watchdog for LOSIDE driver	DC 0 V short circuit at on of the DC 0 V outputs.	Check wiring at the outputs.
			75	Undervoltage test watchdog for HISIDE driver	DC 24 V short circuit at on of the DC 24 V outputs.	
			76	CCW and CW monitoring (in DMC module) activated simultaneously	Multiple activation.	Only one direction of rotation can be activated in the DMC module.
			77			
			78	CCW and CW monitoring range of the OLC activated simultaneously		
			79			
			80	CCW and CW monitoring (in JSS module) was activated simultaneously		
			81			
			82	Timeout error MET. Time monitoring start signal for confirmation button.	Input element with time monitoring is faulty.	• Check wiring of input element • Input element is faulty
			83			
			84	Timeout error MEZ. Time monitoring for two-hand button.	Two-hand operation with time monitoring is faulty.	
			85			
			86	EMU1 monitoring error	Faulty monitoring of the external disconnection channel	• Check hardware connections • Pick-up or release time to short • Check switching contacts
			87			
			88	EMU2 monitoring error		
			89			
110	"Ex-e protection" error	Emergency stop	0	Duration of operation below 5 Hz exceeded	Duration of operation below 5 Hz exceeded	• Check configuration • Shorten duration of operation below 5 Hz
113	Analog input open circuit	No response (P)	0	AI1 analog input open circuit	AI1 analog input open circuit	Check wiring
116	"Timeout MOVI-PLC" error	Rapid stop/ warning	0	MOVI-PLC® communication timeout		• Check startup • Check wiring
123	Positioning interruption	Emergency stop (P)	0	Error "Positioning/Positioning interruption"	Target monitoring when interrupted positioning is resumed. Target would be overrun.	Perform positioning process without interruption until it is complete.

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
124	Ambient conditions	Emergency stop (P)	1	Permitted ambient temperature exceeded	Ambient temperature > 60°C	• Improve ventilation and cooling conditions • Improve air supply to the control cabinet; check filter mats.
196	Power section	Immediate disconnection	1	Discharge resistor	Discharge resistor overload	Observe waiting time for power on/off
			2	Hardware ID precharge/ discharge control	Incorrect precharge/discharge control variant	• Consult SEW Service • Replace precharge/discharge control
			3	Inverter coupling PLD Live	Defective inverter coupling	• Consult SEW Service • Replace inverter coupling
			4	Inverter coupling reference voltage	Defective inverter coupling	• Consult SEW Service • Replace inverter coupling
			5	Power section configuration	Different phase modules installed in the unit	• Inform SEW service. • Check and replace phase modules
			6	Control unit configuration	Control unit line inverter or motor inverter incorrect	Replace or correctly assign the control unit of line and motor inverter.
			7	Communication power section control unit	No communication	Check control unit installation.
			8	Communication precharge/discharge control inverter coupling	No communication	• Check wiring • Consult SEW Service
			10	Communication power section control unit	The inverter coupling does not support protocol	Replace inverter coupling
			11	Communication power section control unit	Faulty communication with inverter coupling at power-up (CRC error).	Replace inverter coupling
			12	Communication power section control unit	Inverter coupling uses protocol that does not match control unit	Replace inverter coupling
			13	Communication power section control unit	Faulty communication with inverter coupling during operation: More than once per second a CRC error.	Replace inverter coupling
			14	Control unit configuration	Missing PLD functionality for EEPROM data set size 7.	Replace control unit
			15	Inverter coupling error	Inverter coupling processor has signaled internal error.	• Consult SEW service if the error reoccurs • Replace inverter coupling
			16	Inverter coupling error: PLD version incompatible		Replace inverter coupling
			17	Precharge/discharge control error	Precharge/discharge control processor has signaled internal error	• Consult SEW service if the error reoccurs • Replace precharge/discharge control
			18	Defective DC link fan	The DC link fan is faulty.	• Consult SEW Service • Check whether DC link choke fan is connected or faulty
			19	Communication power section control unit	Faulty communication with inverter coupling during operation: More than once per second an internal error.	• Consult SEW service if the error reoccurs. • Replace inverter coupling
			20	Communication power section control unit	The control unit has not sent any messages to the inverter coupling for a while.	• Consult SEW service if the error reoccurs. • Replace inverter coupling
			21	Uz measurement implausible phase R	Defective phase module	Consult SEW service if the error reoccurs
			22	Uz measurement implausible phase S		
			23	Uz measurement implausible phase T		

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
197	Supply system	Immediate disconnection	1	Line overvoltage (motor inverter only at start of precharging process)	Inadequate line voltage quality.	• Check supply (fuses, contactor) • Check configuration of the supply system
			2	Line undervoltage (only with line inverter)		
199	DC link charging	Immediate disconnection	4	Precharging was aborted	Unable to charge DC link.	• Precontrol overload • Connected DC link capacity too high • Short circuit in the DC link; check DC link connection in case of several units.

7.3 SEW Electronics Service

7.3.1 Send in for repair

Please contact the **SEW-EURODRIVE electronics service if an error cannot be rectified** (→ "Customer and spare parts service").

When contacting SEW electronics service, always quote the digits on the status label so that our service personnel can assist you more effectively.

Provide the following information when sending the unit in for repair:

- Serial number (→ nameplate)
- Unit designation
- Standard version or application version
- Digits on the status label
- Short description of application (drive application, control via terminals or serial)
- Connected motor (motor type, motor voltage, connection ⅄ or △)
- Nature of the fault
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

7.4 Extended storage

If the unit is stored for a long time, connect it to the mains voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

Procedure when maintenance has been neglected:

Electrolytic capacitors are used in the inverters. They are subject to aging effects when deenergized. This effect can damage the capacitors if the unit is connected using the rated voltage after a longer period of storage.

If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the line voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview.

The following stages are recommended:

AC 400/500 V units:

- Stage 1: AC 0 V to AC 350 V within a few seconds
- Stage 2: AC 350 V for 15 minutes
- Stage 3: AC 420 V for 15 minutes
- Stage 4: AC 500 V for 1 hour

AC 230 V units:

- Stage 1: AC 170 V for 15 minutes
- Stage 2: AC 200 V for 15 minutes
- Stage 3: AC 240 V for 1 hour

After you have completed the regeneration process, the unit can be used immediately or stored again for an extended period with maintenance.

7.5 Disposal

Please follow the current instructions. Dispose in accordance with the material structure and the regulations in force for instance as:

- Electronics scrap (circuit boards)
- Plastic (housing)
- Sheet metal
- copper

8 Technical Data and Dimension Drawings

8.1 CE marking, UL approval and C-Tick

8.1.1 CE-marking

- Low voltage directive

  MOVIDRIVE® MDX60B/61B inverters comply with the regulations of the Low Voltage Directive 2006/95/EC.

- Electromagnetic compatibility (EMC)

  The designated use of MOVIDRIVE® inverters and regenerative power supply units is as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives". Provided that you comply with the installation instructions for the SEW components, the CE marking requirements for the entire machine/system in which they are installed are satisfied on the basis of the EMC directive 2004/108/EC. For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

- Compliance with limit classes C1, C2 or C3 has been tested in a CE-typical drive system. SEW-EURODRIVE can provide detailed information on request.

CE

The CE-mark on the nameplate indicates conformity with the low voltage directive 2006/95/EC. We can provide a declaration of conformity on request.

8.1.2 UL- / cUL / GOST-R

c UL us

UL, cUL approval (USA) and the GOST-R certificate (Russia) have been approved for the entire MOVIDRIVE® unit series. cUL is equivalent to CSA approval.

8.1.3 C-Tick

C-Tick approval has been granted for the entire MOVIDRIVE® range of units. C-Tick certifies conformity with ACMA (Australian Communications and Media Authority) standards.

8.2 General technical data

The following table lists the technical data applicable to all MOVIDRIVE® MDX60B/61B inverters, regardless of their type, version, size and performance.

MOVIDRIVE® MDX60B/61B	All sizes
Interference immunity	Meets EN 61800-3
Interference emission with EMC compliant installation	Sizes 0 to 7 meet EN 61800-3 Sizes 0 to 5: According to limit value class C1 to 61800-3 with a corresponding line filter Sizes 0, 1, 2S, and 2 in accordance with limit value class C2 to EN 61800-3 without additional measures Size 6 and 7 in accordance with limit value class C2 to EN 61800-3 with corresponding line filter
Ambient temperature ϑ_U **I_N reduction** **Ambient temperature** **Climate class**	0 °C...+50 °C at I_D = 100 % I_N and f_{PWM} = 4 kHz / size 7: 2.5 kHz 0 °C...+40 °C at I_D = 125 % I_N and f_{PWM} = 4 kHz / size 7: 2.5 kHz 0 °C...+40 °C at I_D = 100 % I_N and f_{PWM} = 8 kHz / size 7: 4 kHz 2.5 % I_N per K between 40 °C - 50 °C 3 % I_N per K at 50 °C - 60 °C EN 60721-3-3, class 3K3
Storage temperature[1] **ϑ_L**	–25 °C...+70 °C (EN 60721-3-3, class 3K3) DBG keypad: –20 °C...+60 °C
Cooling type (DIN 41751)	Forced cooling (temperature-controlled fan, response threshold 45 °C)
Degree of protection EN 60529 (NEMA1) **Sizes 0 to 3** **Sizes 4 to 6** **Size 7**	 IP20 IP00 (power connections) IP10 (power connections) with • fitted Plexiglas cover supplied as standard and • shrink tubing (not included in scope of delivery) IP10 (power connections) Refer to section "Touch guard" (page 56).
Operating mode	Continuous operation with 50% overload capacity (size 0: 100 %)
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Protection against mechanically active substances	391
Protection against chemically active substances	3C2
Installation altitude h	Up to h ≤ 1000 m (3281 ft) without restrictions. The following restrictions apply at h ≥ 1000 m (3281 ft): • from 1000 m (3281 ft) to max. 4000 m (13120 ft): – I_N reduction by 1 % per 100 m (328 ft) • from 2000 m (6562 ft) to max. 4000 m (13120 ft): – AC 230 V units: U_N reduction by AC 3 V per 100 m (328 ft) – AC 500 V units: U_N reduction by AC 6 V per 100 m (328 ft) Over 2000 m (6562 ft) only overvoltage class 2, external measures are required for overvoltage class 3. Overvoltage classes according to DIN VDE 0110-1.

1) In case of long-term storage, the unit must be connected to the mains voltage for at least 5 minutes every two years, otherwise the unit's service life may be reduced.

8.2.1 MOVIDRIVE® MDX60/61B unit series, size 0

The following figure shows the MOVIDRIVE® MDX60/61B unit series, size 0

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8.2.2 MOVIDRIVE® MDX61B unit series, sizes 1 to 7

The following figure shows the MOVIDRIVE® MDX61B unit series, sizes 1 to 7

2059056779

8.3 MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)

8.3.1 Size 0

MOVIDRIVE® MDX60/61B		0005-5A3-4-0_	0008-5A3-4-0_	0011-5A3-4-0_	0014-5A3-4-0_
Size		0S		0M	
INPUT					
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 380 V - 500 V			
Line frequency	f_{supply}	50 Hz ... 60 Hz ±5 %			
Nominal supply system current[1] (at V_{supply} = 3 × AC 400 V)	I_{supply} 100 % 125 %	AC 1.8 A AC 2.3 A	AC 2.2 A AC 2.7 A	AC 2.8 A AC 3.5 A	AC 3.6 A AC 4.5 A
OUTPUT					
Apparent output power[2] (at V_{supply} = 3 × AC 380...500 V)	S_N	1.4 kVA	1.6 kVA	2.1 kVA	2.8 kVA
Rated output current[1] (at V_{supply} = 3 × AC 400 V)	I_N	AC 2 A	AC 2.4 A	AC 3.1 A	AC 4 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 400 V and f_{PWM} = 4 kHz)	I_D	AC 2.5 A	AC 3 A	AC 3.8 A	AC 5 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 400 V and f_{PWM} = 8 kHz)	I_D	AC 2 A	AC 2.4 A	AC 3.1 A	AC 4 A
Current limitation	I_{max}	Motor and regenerative 200 % I_N, duration depending on capacity utilization			
Internal current limitation		I_{max} = 0...200 % adjustable			
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	68 Ω			
Output voltage	V_O	Max. V_{line}			
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz			
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range			
GENERAL INFORMATION					
Power loss at S_N [2]	P_{Vmax}	42 W	48 W	58 W	74 W
Cooling air consumption		3 m^3/h		9 m^3/h	
Cross section of unit terminals X1, X2, X3, X4		Terminal blocks 4 mm^2 conductor end sleeves DIN 46228			
Tightening torque		0.6 Nm			

1) The system and output currents must be reduced by 20 % from the nominal values for V_{supply} = 3 x AC 500 V.

2) The performance data applies to f_{PWM} = 4 kHz.

MDX61B standard version	0005-5A3-4-00	0008-5A3-4-00	0011-5A3-4-00	0014-5A3-4-00
Part number	827 722 2	827 723 0	827 724 9	827 725 7
MDX61B Application version	0005-5A3-4-0T	0008-5A3-4-0T	0011-5A3-4-0T	0014-5A3-4-0T
Part number	827 726 5	827 727 3	827 728 1	827 729 X
Constant load Recommended motor power P_{Mot}	0.55 kW (0.74 HP)	0.75 kW (1.0 HP)	1.1 kW (1.5 HP)	1.5 kW (2.0 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	0.75 kW (1.0 HP)	1.1 kW (1.5 HP)	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)
Weight	2.0 kg (4.4 lb)		2.5 kg (5.5 lb)	
Dimensions W × H × D	45 mm × 317 mm × 260 mm (1.8 in x 12.5 in x 10.2 in)		67,5 mm × 317 mm × 260 mm (2.66 in x 12.5 in x 10.2 in)	

MDX61B standard version (VFC/CFC/SERVO)	0005-5A3-4-00	0008-5A3-4-00	0011-5A3-4-00	0014-5A3-4-00
Part number	827 730 3	827 731 1	827 732 X	827 733 8
MDX61B Application version (VFC/CFC/SERVO)	0005-5A3-4-0T	0008-5A3-4-0T	0011-5A3-4-0T	0014-5A3-4-0T
Part number	827 734 6	827 735 4	827 736 2	827 737 0
Weight	2.3 kg (5.1 lb)		2.8 kg (6.2 lb)	
Dimensions W × H × D	72.5 mm × 317 mm × 260 mm (2.85 in ×12.5 in ×10.2 in)		95 mm × 317 mm × 260 mm (3.7 in ×12.5 in ×10.2 in)	
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"			

8.3.2 Size 1 (AC 400/500 V units)

MOVIDRIVE® MDX61B	0015-5A3-4-0_	0022-5A3-4-0_	0030-5A3-4-0_	0040-5A3-4-0_
INPUT				
Nominal supply voltage (to EN 50160) V_{supply}	3 × AC 380 V - 500 V			
supply frequency f_{supply}	50 Hz ... 60 Hz ±5 %			
Nominal supply system current[1] I_{supply} 100 % **(at V_{supply} = 3 × AC 400 V) 125 %**	AC 3.6 A AC 4.5 A	AC 5.0 A AC 6.2 A	AC 6.3 A AC 7.9 A	AC 8.6 A AC 10.7 A
OUTPUT				
Apparent output power[2] S_N **(at V_{supply} = 3 × AC 380...500 V)**	2.8 kVA	3.8 kVA	4.9 kVA	6.6 kVA
Rated output current[1] I_N **(at V_{supply} = 3 × AC 400 V)**	AC 4 A	AC 5.5 A	AC 7 A	AC 9.5 A
Continuous output current (= 125 % I_N) I_D **(at V_{supply} = 3 × AC 400 V and f_{PWM} = 4 kHz)**	AC 5 A	AC 6.9 A	AC 8.8 A	AC 11.9 A
Continuous output current (= 100 % I_N) I_D **(at V_{supply} = 3 × AC 400 V and f_{PWM} = 8 kHz)**	AC 4 A	AC 5.5 A	AC 7 A	AC 9.5 A
Current limitation I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization			
Internal current limitation	I_{max} = 0...150 % adjustable			
Minimum permitted brake resistance value (4Q operation) R_{BWmin}	68 Ω			
Output voltage V_O	Max. V_{supply}			
PWM frequency f_{PWM}	Adjustable: 4/8/12/16 kHz			
Speed range/resolution n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range			
GENERAL INFORMATION				
Power loss at S_N [2] P_{Vmax}	85 W	105 W	130 W	180 W
Cooling air consumption	40 m^3/h			
Weight	3.5 kg (7.7 lb)			
Dimensions W × H × D	105 mm × 314 mm × 234 mm (4.13 in ×12.4 in ×9.21 in)			
Cross section of unit terminals X1, X2, X3, X4	Terminal blocks 4 mm^2 conductor end sleeves DIN 46228			
Tightening torque	0.6 Nm			

1) The system and output currents must be reduced by 20 % from the nominal values for V_{supply} = 3 x AC 500 V.

2) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version	0015-5A3-4-00	0022-5A3-4-00	0030-5A3-4-00	0040-5A3-4-00
Part number	827 957 8	827 958 6	827 959 4	827 960 8
MDX61B Application version	**0015-5A3-4-0T**	**0022-5A3-4-0T**	**0030-5A3-4-0T**	**0040-5A3-4-0T**
Part number	827 975 6	827 976 4	827 977 2	827 978 0
Constant load **Recommended motor power P_{Mot}**	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)	3.0 kW (4.0 HP)	4.0 kW (5.4 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	2.2 kW (3.0 HP)	3.0 kW (4.0 HP)	4.0 kW (5.4 HP)	5.5 kW (7.4 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"			

8.3.3 Sizes 2S and 2 (AC 400/500 V units)

MOVIDRIVE® MDX61B	0055-5A3-4-0_	0075-5A3-4-0_	0110-5A3-4-0_
Size	2S		2
INPUT			
Nominal supply voltage (to EN 50160) V_{supply}	3 × AC 380 V - 500 V		
supply frequency f_{supply}	50 Hz ... 60 Hz ±5 %		
Nominal supply system current[1] I_{supply} 100 % **(at V_{supply} = 3 × AC 400 V) 125 %**	AC 11.3 A AC 14.1 A	AC 14.4 A AC 18.0 A	AC 21.6 A AC 27.0 A
OUTPUT			
Apparent output power[2] S_N **(at V_{supply} = 3 × AC 380...500 V)**	8.7 kVA	11.2 kVA	16.8 kVA
Rated output current[1] I_N **(at V_{supply} = 3 × AC 400 V)**	AC 12.5 A	AC 16 A	AC 24 A
Continuous output current (= 125 % I_N) I_D **(at V_{supply} = 3 × AC 400 V with f_{PWM} = 4 kHz)**	AC 15.6 A	AC 20 A	AC 30 A
Continuous output current (= 100 % I_N) I_D **(at V_{supply} = 3 × AC 400 V with f_{PWM} = 8 kHz)**	AC 12.5 A	AC 16 A	AC 24 A
Current limitation I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization		
Internal current limitation	I_{max} = 0...150 % adjustable		
Minimum permitted brake R_{BWmin} resistance value (4Q operation)	47 Ω		22 Ω
Output voltage V_O	Max. V_{supply}		
PWM frequency f_{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL INFORMATION			
Power loss at S_N [2] P_{Vmax}	220 W	290 W	400 W
Cooling air consumption	80 m^3/h		
Weight	6.6 kg (15 lb)		
Dimensions W × H × D	105 mm × 335 mm × 294 mm (4.13 in ×13.2 in ×11.6 in)		135 mm × 315 mm × 285 mm (5.31 in ×12.4 in ×11.2 in)
Cross section of unit terminals X1, X2, X3, X4	Terminal blocks 4 mm^2 conductor end sleeves DIN 46228		M4 screw and washer assembly with terminal clip 4 mm^2 conductor end sleeve DIN 46228 6 mm^2 crimp cable lug DIN 46234
Tightening torque	0.6 Nm		1.5 Nm

1) The system and output currents must be reduced by 20 % from the nominal values for V_{supply} = 3 x AC 500 V.

2) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version	0055-5A3-4-00	0075-5A3-4-00	0110-5A3-4-00
Part number	827 961 6	827 962 4	827 963 2
MDX61B Application version	**0055-5A3-4-0T**	**0075-5A3-4-0T**	**0110-5A3-4-0T**
Part number	827 979 9	827 980 2	827 981 0
Constant load **Recommended motor power P_{Mot}**	5.5 kW (7.4 HP)	7.5 kW (10 HP)	11 kW (15 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	7.5 kW (10 HP)	11 kW (15 HP)	15 kW (20 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"		

8.3.4 Size 3 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0150-503-4-0_	0220-503-4-0_	0300-503-4-0_
INPUT				
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 380 V - 500 V		
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %		
Nominal supply system current[1] (at V_{supply} = 3 × AC 400 V)	I_{supply} 100 % 125 %	AC 28.8 A AC 36 A	AC 41.4 A AC 51.7 A	AC 54 A AC 67.5 A
OUTPUT				
Apparent output power[2] (at V_{supply} = 3 × AC 380...500 V)	S_N	22.2 kVA	31.9 kVA	41.6 kVA
Rated output current[1] (at V_{supply} = 3 × AC 400 V)	I_N	AC 32 A	AC 46 A	AC 60 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 4 kHz)	I_D	AC 40 A	AC 57.5 A	AC 75 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 8 kHz)	I_D	AC 32 A	AC 46 A	AC 60 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization		
Internal current limitation		I_{max} = 0...150 % adjustable		
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	15 Ω	12 Ω	
Output voltage	V_O	Max. V_{supply}		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL INFORMATION				
Power loss at S_N [2]	P_{Vmax}	550 W	750 W	950 W
Cooling air consumption		180 m^3/h		
Weight		15.0 kg (33 lb)		
Dimensions	W × H × D	200 mm × 465 mm × 308 mm (7.87 in ×18.3 in ×12.1 in)		
Cross section of unit terminals X1, X2, X3, X4		M6 screw with washer max. 25 mm^2 Crimp cable lug DIN 46234		
Tightening torque		3.5 Nm		

1) The system and output currents must be reduced by 20 % from the nominal values for V_{supply} = 3 x AC 500 V.

2) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version	0150-503-4-00	0220-503-4-00	0300-503-4-00
Part number	827 964 0	827 965 9	827 966 7
MDX61B Application version	**0150-503-4-0T**	**0220-503-4-0T**	**0300-503-4-0T**
Part number	827 982 9	827 983 7	827 984 5
Constant load **Recommended motor power P_{Mot}**	15 kW (20 HP)	22 kW (30 HP)	30 kW (40 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	22 kW (30 HP)	30 kW (40 HP)	37 kW (50 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"		

8.3.5 Size 4 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0370-503-4-0_	0450-503-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 380 V - 500 V	
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %	
Nominal supply system current[1] **(at V_{supply} = 3 × AC 400 V)**	I_{supply} 100 % 125 %	AC 65.7 A AC 81.9 A	AC 80.1 A AC 100.1 A
OUTPUT			
Apparent output power[2] **(at V_{supply} = 3 × AC 380...500 V)**	S_N	51.1 kVA	62.3 kVA
Rated output current[1] **(at V_{supply} = 3 × AC 400 V)**	I_N	AC 73 A	AC 89 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 4 kHz)	I_D	AC 91 A	AC 111 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 8 kHz)	I_D	AC 73 A	AC 89 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization	
Internal current limitation		I_{max} = 0...150 % adjustable	
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	6 Ω	
Output voltage	V_O	Max. V_{supply}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL INFORMATION			
Power loss at S_N [2]	P_{Vmax}	1200 W	1450 W
Cooling air consumption		180 m^3/h	
Weight		27 kg (60 lb)	
Dimensions	W × H × D	280 mm × 522 mm × 307 mm (11.0 in ×20.6 in ×12.1 in)	
Cross section of unit terminals X1, X2, X3, X4		M10 bolt with nut Max. 70 mm^2 Press cable lug DIN 46235	
Tightening torque		14 Nm	

1) The system and output currents must be reduced by 20 % from the nominal values for V_{supply} = 3 x AC 500 V.

2) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version	0370-503-4-00	0450-503-4-00
Part number	827 967 5	827 968 3
MDX61B Application version	**0370-503-4-0T**	**0450-503-4-0T**
Part number	827 985 3	827 986 1
Constant load **Recommended motor power P_{Mot}**	37 kW (50 HP)	45 kW (60 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	45 kW (60 HP)	55 kW (74 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"	

8.3.6 Size 5 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0550-503-4-0_	0750-503-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 380 V - 500 V	
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %	
Nominal supply system current[1] **(at V_{supply} = 3 × AC 400 V)**	I_{supply} 100 % 125 %	AC 94.5 A AC 118.1 A	AC 117 A AC 146.3 A
OUTPUT			
Apparent output power[2] **(at V_{supply} = 3 × AC 380...500 V)**	S_N	73.5 kVA	91.0 kVA
Rated output current[1] **(at V_{supply} = 3 × AC 400 V)**	I_N	AC 105 A	AC 130 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 4 kHz)	I_D	AC 131 A	AC 162 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 8 kHz)	I_D	AC 105 A	AC 130 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization	
Internal current limitation		I_{max} = 0...150 % adjustable	
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	6 Ω	4 Ω
Output voltage	V_O	Max. V_{supply}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL INFORMATION			
Power loss at S_N [2]	P_{Vmax}	1700 W	2000 W
Cooling air consumption		360 m^3/h	
Weight		35 kg (77 lb)	
Dimensions	W × H × D	280 mm × 610 mm × 330 mm (11.0 in ×24.0 in ×13.0 in)	
Cross section of unit terminals X1, X2, X3, X4		M10 bolt with nut Max. 70 mm^2 Press cable lug DIN 46235	
Tightening torque		14 Nm	

1) The system and output currents must be reduced by 20 % from the nominal values for V_{supply} = 3 x AC 500 V.

2) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version	0550-503-4-00	0750-503-4-00
Part number	827 969 1	827 970 5
MDX61B Application version	**0550-503-4-0T**	**0750-503-4-0T**
Part number	827 988 8	827 989 6
Constant load **Recommended motor power P_{Mot}**	55 kW (74 HP)	75 kW (100 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	75 kW (100 HP)	90 kW (120 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"	

8.3.7 Size 6 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0900-503-4-0_	1100-503-4-0_	1320-503-4-0_
INPUT				
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 380 V - 500 V		
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %		
Nominal supply system current[1]	I_{supply} 100 %	AC 153 A	AC 180 A	AC 225 A
(at V_{supply} = 3 × AC 400 V)	125 %	AC 191 A	AC 225 A	AC 281 A
OUTPUT				
Apparent output power[2] **(at V_{supply} = 3 × AC 380...500 V)**	S_N	118 kVA	139 kVA	174 kVA
Rated output current[1] **(at V_{supply} = 3 × AC 400 V)**	I_N	AC 170 A	AC 200 A	AC 250 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 4 kHz)	I_D	AC 212 A	AC 250 A	AC 312 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 4 kHz) Temperature range 0 °C ... +50 °C	I_D	AC 170 A	AC 200 A	AC 250 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization		
Internal current limitation		I_{max} = 0...150 % adjustable		
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	2.7 Ω		
Output voltage	V_O	Max. V_{supply}		
PWM frequency	f_{PWM}	Adjustable: 4 or 8 kHz		
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL INFORMATION				
Power loss at S_N [2]	P_{Vmax}	2300 W	2500 W	2700 W
Cooling air consumption		600 m^3/h		
Weight		60 kg (130 lb)		
Dimensions	W × H × D	280 mm × 1000 mm × 382 mm (11.0 in ×39.37 in × 15.0 in		
Cross section of unit terminals X1, X2, X3, X4		M12 bolt with nut Max. 185 mm^2 Press cable lug DIN 46235		
Tightening torque		20 Nm		

1) The system and output currents must be reduced by 20 % from the nominal values for V_{supply} = 3 x AC 500 V.

2) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version	0900-503-4-00	1100-503-4-00	1320-503-4-00
Part number	827 971 3	827 972 1	827 974 8
MDX61B Application version	**0900-503-4-0T**	**1100-503-4-0T**	**1320-503-4-0T**
Part number	827 991 8	827 992 6	827 993 4
Constant load Recommended motor power P_{Mot}	90 kW (120 HP)	110 kW (148 HP)	132 kW (177 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	110 kW (148 HP)	132 kW (177 HP)	160 kW (215 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"		

8.3.8 Size 7 (AC 400/500 V units)

MOVIDRIVE® MDX61B		1600-503-2-0T/L 1600-503-4-0T/L	2000-503-2-0T/L 2000-503-4-0T/L	2500-503-2-0T/L 2500-503-4-0T/L
INPUT				
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 380 V - 500 V		
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %		
Nominal supply current[1] **(at V_{supply} = 3 × AC 400 V)**	I_{supply} 100 % 125 %	AC 280 A AC 340 A	AC 340 A AC 425 A	AC 435 A AC 535 A
OUTPUT				
Apparent output power[2] **(at V_{supply} = 3 × AC 380...500 V)**	S_N	208 kVA	263 kVA	326 kVA
Rated output current[1] **(at V_{supply} = 3 × AC 400 V)**	I_N	AC 300 A	AC 380 A	AC 470 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 2.5 kHz)	I_D	AC 375 A	AC 475 A	AC 588 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 400 V with f_{PWM} = 2.5 kHz) Temperature range 0 °C ... +50 °C	I_D	AC 300 A	AC 380 A	AC 470 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization		
Internal current limitation		I_{max} = 0...150 % adjustable		
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	1.1 Ω		
Output voltage	V_O	Max. V_{supply}		
PWM frequency	f_{PWM}	Adjustable: 2.5 or 4 kHz		
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL INFORMATION				
Power loss at S_N [2]	P_{Vmax}	3000 W	3600 W	4400 W
Cooling air consumption		1200 m^3/h		
Weight		2Q variant: 260 kg (573 lb) 4Q variant: 280 kg (617 lb)		
Dimensions	W × H × D	700 mm × 1490 mm × 470 mm (27.6 in ×58.7 in ×18.5 in)		
Conductor rails X1, X2, X3		Connection rail with bore for M12 Max. 2 x 240 mm^2 Press cable lug DIN 46235		
Tightening torque		70 Nm (620 lb in)		

1) The system and output currents must be reduced by 20 % from the nominal values for V_{supply} = 3 x AC 500 V.

2) The performance data applies to f_{PWM} = 2.5 kHz.

MDX61B Application version With coated printed circuit boards	1600-503-2-0T/L 1600-503-4-0T/L	2000-503-2-0T/L 2000-503-4-0T/L	2500-503-2-0T/L 2500-503-4-0T/L
Part number	829 976 5 829 980 3	829 977 3 829 981 1	829 978 1 829 983 8
Constant load Recommended motor power P_{Mot}	160 kW (215 HP)	200 kW (268 HP)	250 kW (335 HP)
Variable torque load or constant load without overload Recommended motor power P_{Mot}	200 kW (268 HP)	250 kW (335 HP)	315 kW (422 HP)
Recommended motor power	See MOVIDRIVE® B system manual, section "Motor selection"		

8.4 MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)

8.4.1 Size 1 (AC 230 V units)

MOVIDRIVE® MDX61B		0015-2A3-4-0_	0022-2A3-4-0_	0037-2A3-4-0_
INPUT				
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 200 V - 240 V		
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %		
Rated supply current (at V_{supply} = 3 × AC 230 V)	I_{supply} 100 % 125 %	AC 6.7 A AC 8.4 A	AC 7.8 A AC 9.8 A	AC 12.9 A AC 16.1 A
OUTPUT				
Apparent output power[1] (at V_{supply} = 3 × AC 230...240 V)	S_N	2.7 kVA	3.4 kVA	5.8 kVA
Nominal output current (at V_{supply} = 3 × AC 230 V)	I_N	AC 7.3 A	AC 8.6 A	AC 14.5 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 9.1 A	AC 10.8 A	AC 18.1 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 230 V with f_{PWM} = 8 kHz)	I_D	AC 7.3 A	AC 8.6 A	AC 14.5 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization		
Internal current limitation		I_{max} = 0...150 % adjustable		
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	27 Ω		
Output voltage	V_O	Max. V_{supply}		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL INFORMATION				
Power loss at S_N [1]	P_{Vmax}	110 W	126 W	210 W
Cooling air consumption		40 m^3/h		
Weight		2.8 kg (6.2 lb)		
Dimensions	W × H × D	105 mm × 314 mm × 234 mm (4.13 in ×12.4 in ×9.21 in)		
Cross section of unit terminals X1, X2, X3, X4		Separable terminal strip 4 mm^2 conductor end sleeve DIN 46228		
Tightening torque		0.6 Nm		

1) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version	0015-2A3-4-00	0022-2A3-4-00	0037-2A3-4-00
Part number	827 994 2	827 995 0	827 996 9
MDX61B Application version	**0015-2A3-4-0T**	**0022-2A3-4-0T**	**0037-2A3-4-0T**
Part number	828 003 7	828 004 5	828 005 3
Constant load Recommended motor power P_{Mot}	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)	3.7 kW (5.0 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	2.2 kW (3.0 HP)	3.7 kW (5.0 HP)	5.0 kW (6.7 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"		

8.4.2 Size 2 (AC 230 V units)

MOVIDRIVE® MDX61B		0055-2A3-4-0_	0075-2A3-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 200 V - 240 V	
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %	
Rated supply current (at V_{supply} = 3 × AC 230 V)	I_{supply} 100 % 125 %	AC 19.5 A AC 24.4 A	AC 27.4 A AC 34.3 A
OUTPUT			
Apparent output power[1] (at V_{supply} = 3 × AC 230...240 V)	S_N	8.8 kVA	11.6 kVA
Nominal output current (at V_{supply} = 3 × AC 230 V)	I_N	AC 22 A	AC 29 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 27.5 A	AC 36.3 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 230 V with f_{PWM} = 8 kHz)	I_D	AC 22 A	AC 29 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization	
Internal current limitation		I_{max} = 0...150 % adjustable	
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	12 Ω	
Output voltage	V_O	Max. V_{supply}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_A / Δn_R	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL INFORMATION			
Power loss at S_N [1]	P_{Vmax}	300 W	380 W
Cooling air consumption		80 m^3/h	
Weight		5.9 kg (13 lb)	
Dimensions	W × H × D	135 mm × 315 mm × 285 mm (5.31 in ×12.4 in ×11.2 in)	
Cross section of unit terminals X1, X2, X3, X4		M4 screw and washer assembly with terminal clip 4 mm^2 conductor end sleeve DIN 46228 6 mm^2 crimp cable lug DIN 46234	
Tightening torque		1.5 Nm	

1) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version		0055-2A3-4-00	0075-2A3-4-00
Part number		827 997 7	827 998 5
MDX61B Application version		**0055-2A3-4-0T**	**0075-2A3-4-0T**
Part number		828 006 1	828 008 8
Constant load Recommended motor power	P_{Mot}	5.5 kW (7.4 HP)	7.5 kW (10 HP)
Variable torque load or constant load without overload recommended motor power	P_{Mot}	7.5 kW (10 HP)	11 kW (15 HP)
Recommended motor power		→ MOVIDRIVE® B system manual, section "Motor selection"	

8.4.3 Size 3 (AC 230 V units)

MOVIDRIVE® MDX61B		0110-203-4-0_	0150-203-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 200 V - 240 V	
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %	
Rated supply current (at V_{supply} = 3 × AC 230 V)	I_{supply} 100 % 125 %	AC 40 A AC 50 A	AC 49 A AC 61 A
OUTPUT			
Apparent output power[1] (at V_{supply} = 3 × AC 230...240 V)	S_N	17.1 kVA	21.5 kVA
Nominal output current (at V_{supply} = 3 × AC 230 V)	I_N	AC 42 A	AC 54 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 52.5 A	AC 67.5 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 230 V with f_{PWM} = 8 kHz)	I_D	AC 42 A	AC 54 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization	
Internal current limitation		I_{max} = 0...150 % adjustable	
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	7.5 Ω	5.6 Ω
Output voltage	V_O	Max. V_{supply}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL INFORMATION			
Power loss at S_N[1]	P_{Vmax}	580 W	720 W
Cooling air consumption		180 m^3/h	
Weight		14.3 kg (31.5 lb)	
Dimensions	W × H × D	200 mm × 465 mm × 308 mm (7.87 in ×18.3 in ×12.1 in)	
Cross section of unit terminals X1, X2, X3, X4		M6 screw and washer assembly with washer max. 25 mm^2 Crimp cable lug DIN 46234	
Tightening torque		3.5 Nm	

1) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version	0110-203-4-00	0150-203-4-00
Part number	827 999 3	828 000 2
MDX61B Application version	**0110-203-4-0T**	**0150-203-4-0T**
Part number	828 009 6	828 011 8
Constant load **Recommended motor power P_{Mot}**	11 kW (15 HP)	15 kW (20 HP)
Variable torque load or constant load without overload recommended motor power P_{Mot}	15 kW (20 HP)	22 kW (30 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"	

8.4.4 Size 4 (AC 230 V units)

MOVIDRIVE® MDX61B		0220-203-4-0_	0300-203-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 200 V - 240 V	
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %	
Rated supply current (at V_{supply} = 3 × AC 230 V)	I_{supply} 100 % 125 %	AC 72 A AC 90 A	AC 86 A AC 107 A
OUTPUT			
Apparent output power[1] (at V_{supply} = 3 × AC 230...240 V)	S_N	31.8 kVA	37.8 kVA
Nominal output current (at V_{supply} = 3 × AC 230 V)	I_N	AC 80 A	AC 95 A
Continuous output current (= 125 % I_N) (at V_{supply} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 100 A	AC 118 A
Continuous output current (= 100 % I_N) (at V_{supply} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 80 A	AC 95 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization	
Internal current limitation		I_{max} = 0...150 % adjustable	
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	3 Ω	
Output voltage	V_O	Max. V_{supply}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_A / Δn_A	–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL INFORMATION			
Power loss at S_N [1]	P_{Vmax}	1100 W	1300 W
Cooling air consumption		180 m^3/h	
Weight		26.3 kg (57 lb)	
Dimensions	W × H × D	280 mm × 522 mm × 307mm (11.0 in × 20.6 in × 12.1 in)	
Cross section of unit terminals X1, X2, X3, X4		M10 bolt with nut max. 70 mm^2 Press cable lug DIN 46235	
Tightening torque		3.5 Nm	

1) The performance data applies to f_{PWM} = 4 kHz.

MDX61B Standard version		**0220-203-4-00**	**0300-203-4-00**
Part number		828 001 0	828 002 9
MDX61B Application version		**0220-203-4-0T**	**0300-203-4-0T**
Part number		828 012 6	828 013 4
	Constant load **Recommended motor power P_{Mot}**	22 kW (30 HP)	30 kW (40 HP)
	Variable torque load or constant load without overload recommended motor power P_{Mot}	30 kW (40 HP)	37 kW (50 HP)
Recommended motor power		→ MOVIDRIVE® B system manual, section "Motor selection"	

8.5 MOVIDRIVE® MDX60/61B electronics data

MOVIDRIVE® MDX60/61B		General electronics data	
Voltage supply for setpoint input	X11:1 X11:5	REF1: DC+10 V +5 % / –0 %, I_{max} = DC 3 mA REF2: DC–10 V +0 % / –5 %, I_{max} = DC 3 mA	Reference voltages for setpoint potentiometer
Setpoint input n1 (differential input) Operating mode AI11/AI12 Resolution Internal resistance	X11:2/X11:3	AI11/AI12: Voltage or current input, can be set with S11 and P11_, sampling interval 1 ms Voltage input: n1 = DC 0...+10 V or DC –10 V...0...+10 V 12 bit R_i = 40 kΩ (external voltage supply) R_i = 20 kΩ (supply from REF1/REF2)	Current input: n1 = DC 0...20 mA or DC 4...20 mA 11 bit R_i = 250 Ω
Internal setpoints		Parameter set 1: n11/n12/n13 = –6000...0...+6000 rpm Parameter set 2: n21/n22/n23 = –6000...0...+6000 rpm	
Time ranges of the speed ramps at Δn = 3000 rpm		1. Ramp t11/t21 up: 0...2000 s down: 0..2000 s 2. Ramp t12/t22 up = down: 0...2000 s Stop ramp t13/t23 down: 0...20 s Emergency ramp t14/t24 down: 0...20 s Motor potentiometer t3 up: 0.2...50 s down: 0.2...50 s	
Auxiliary voltage output[1] X13:8/X10:8		VO24: V_{OUT} = DC 24 V, maximum current carrying capacity I_{max} = DC 400 mA	
External voltage supply[1]	X10:9	VI24: U_{IN} = DC 24 V –15 % / +20 % according to EN 61131-2 With size 7, connect 24 V backup voltage via the DC power supply unit. No connection at the control unit.	
Binary inputs X13:1...X13:6 and X16:1/X16:2 Internal resistance		Isolated (optocoupler), PLC-compatible (EN 61131), sampling interval 1 ms DIØØ...DIØ5 and DIØ6/DIØ7 R_i ≈ 3 kΩ, I_E ≈ DC 10 mA	
Signal level		DC +13 V...+30 V = "1" = Contact closed DC –3 V...+5 V = "0" = Contact open	According to EN 61131
Function X13:2...X13:6, X16:1/X16:2	X13:1	DIØØ: With fixed assignment "/Controller inhibit" DIØ1...DIØ5, DIØ6/DIØ7: Selection option → Parameter menu P60_	
Binary outputs[1] X10:3/X10:7 and X16:3...X16:5		PLC-compatible (EN 61131-2), response time 1 ms DBØØ/DOØ2 and DOØ3...DOØ5	
Signal level		"0" = DC 0 V "1" = DC +24 V **Important:** Do not apply external voltage!	
Function X10:7, X16:3...X16:5	X10:3	DBØØ: With fixed assignment "/Brake", I_{max} = DC 150 mA, short-circuit proof, protected against external voltage to DC 30 V DOØ2, DOØ3...DOØ5: Selection option → Parameter menu P62_, I_{max} = DC 50 mA, short-circuit proof, protected against external voltage to DC 30 V	
Relay output	X10:4...X10:6	DOØ1: Load capacity of the relay contacts U_{max} = DC 30 V, I_{max} = DC 800 mA	
Function	X10:4 X10:5 X10:6	DOØ1-C: Shared relay contact DOØ1-NO: Normally open contact DOØ1-NC: NC contact	Selection option → Parameter menu P62_
System bus (SBus)	X12:1 X12:2 X12:3	DGND: Reference potential SC11: SBus high SC12: SBus low	CAN bus according to CAN specification 2.0, parts A and B, transmission technology according to ISO 11898, max. 64 stations, terminating resistor (120 Ω) can be activated using DIP switches
RS485 interface	X13:10 X13:11	ST11: RS485+ ST12: RS485-	EIA standard, 9.6 kbaud, max. 32 stations Max. cable length 200 m Dynamic terminating resistor with fixed installation
TF/TH/KTY input	X10:1	TF1: Response threshold at R_{TF} ≥ 2.9 kΩ ± 10 %	

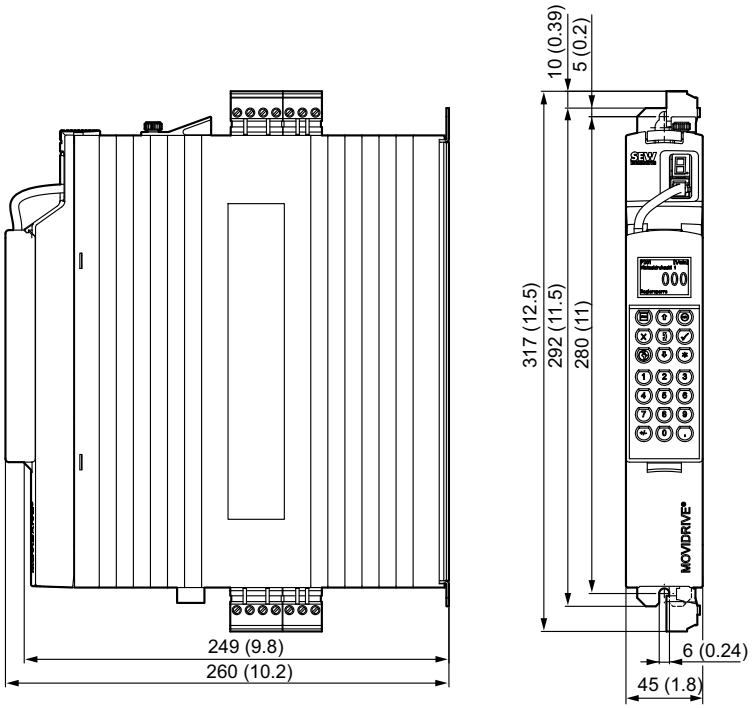
1) The unit provides a current of I_{max} = DC 400 mA for the DC+24 V outputs (VO24, binary outputs). If this value is insufficient, a DC 24 V voltage supply must be connected to X10:9 (VI24).

MOVIDRIVE® MDX60/61B		General electronics data
Reference terminals X12:1/X13:9/X16:6/X10:2/X10:10 Permitted cable cross section	X11:4 X13:7	AGND: Reference potential for analog signals and terminals X11:1 and X11:5 (REF1/REF2) DGND: Reference potential for binary signals, system bus, RS485 interface and TF/TH DCOM: Reference potential for binary inputs X13:1...X13:6 and X16:1/X16:2 (DIØØ...DIØ5 and DIØ6/DIØ7) One core per terminal: 0.20...2.5 mm² (AWG 24...12) Two cores per terminal: 0.25...1 mm² (AWG 22...17)
Safety contact Permitted cable cross section Power consumption Input capacitance Time for restart Time to inhibit output stage	X17:1 X17:2 X17:3 X17:4 X17:4 X17:4 	DGND: Reference potential for X17:2 VO24: : V_{OUT} = DC 24 V, only to supply X17:4 of the same unit; **cannot be used** to supply other units. SOV24: Reference potential for DC+24 V "safe stop" input (safety contact) SVI24: DC+24 V "safe stop" input (safety contact) One core per terminal: 0.08...1.5 mm² (AWG28...16) Two cores per terminal: 0.25 ... 1.0 mm² (AWG23...17) Size 0: 3 W Size 1: 5 W Size 2, 2S: 6 W Size 3: 7.5 W Size 4: 8 W Size 5: 10 W sizes 6 to 7: 6 W Size 0: 27 µF Sizes 1...7: 270 µF t_A = 200 ms t_S = 100 ms
Signal level		DC +19.2 V...+30 V = "1" = Contact closed DC –30 V...+5 V = "0" = Contact open

8.6 MOVIDRIVE® MDX60B dimension drawings

8.6.1 Size 0S

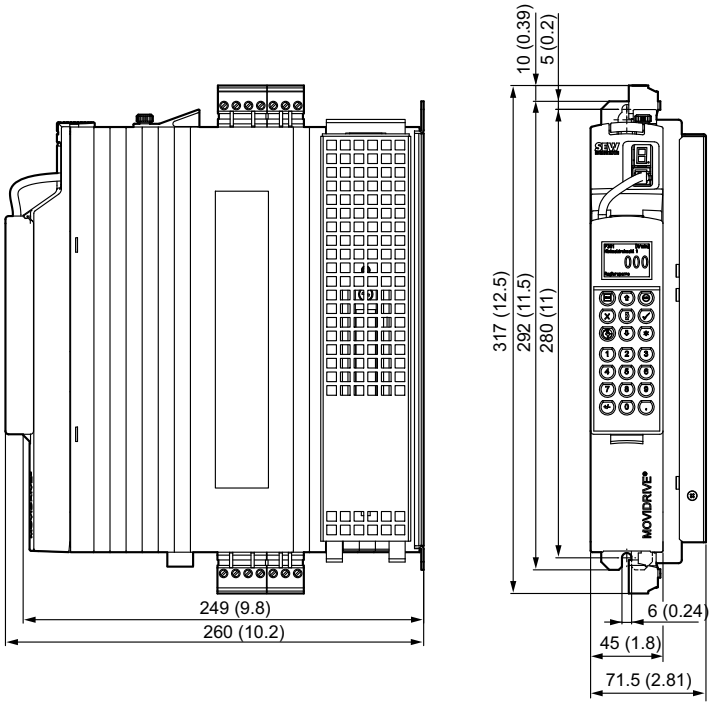
The following dimension drawing shows MDX60B size 0S, dimensions in mm (in)



1940795915

8.6.2 Size 0S with mounted braking resistor

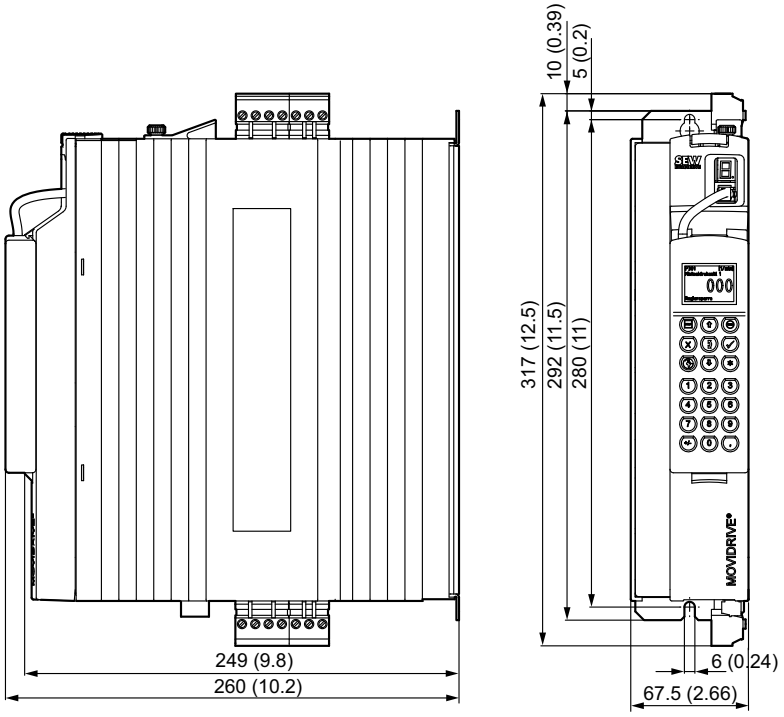
The following dimension drawing shows MDX60B size 0S with braking resistor, dimensions in mm (in)



1940798987

8.6.3 Size 0M

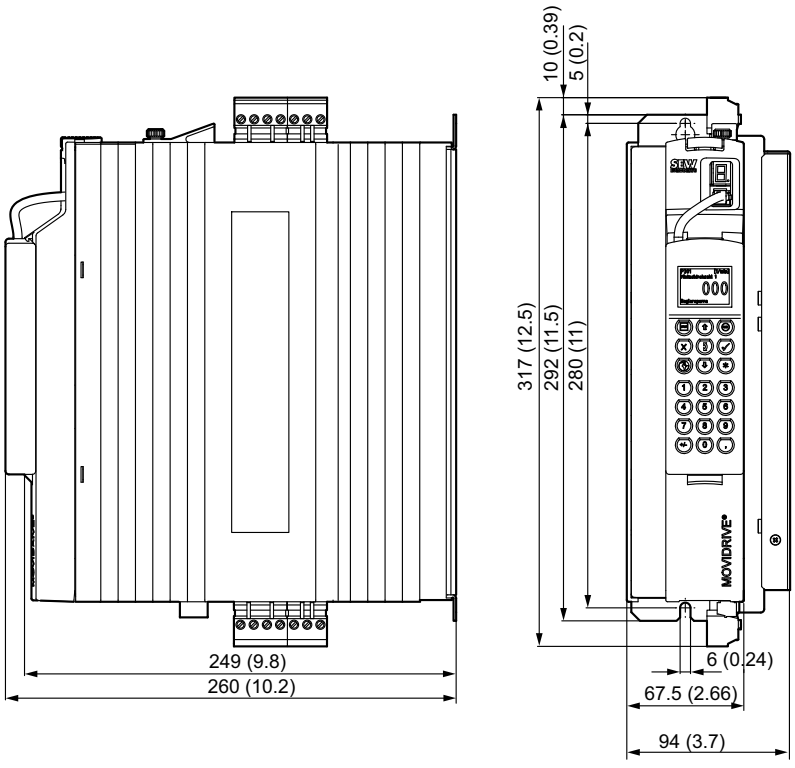
The following dimension drawing shows MDX60B size 0M, dimensions in mm (in)



1940843915

8.6.4 Size 0M with mounted braking resistor

The following dimension drawing shows MDX60B size 0M with braking resistor, dimensions in mm (in)



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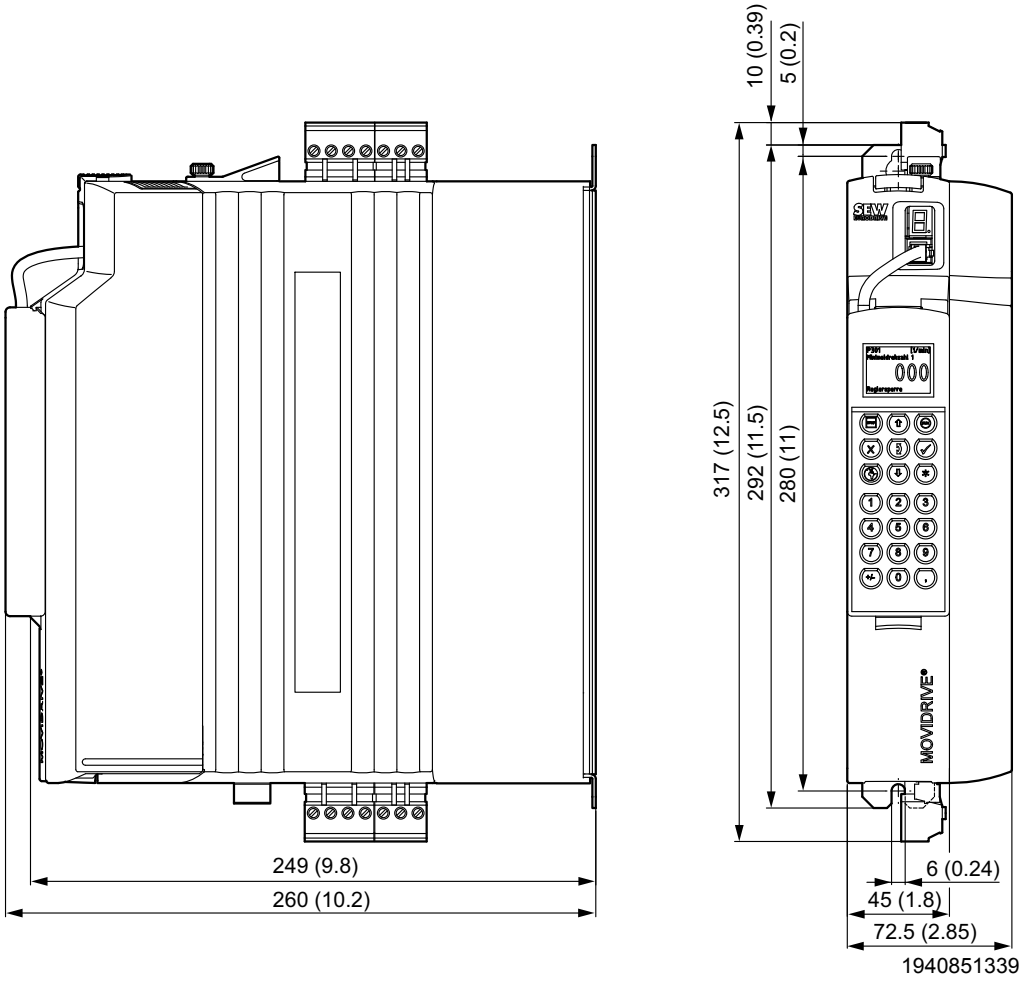
8.7 MOVIDRIVE® MDX61B dimension drawings

	INFORMATION
	For MOVIDRIVE® MDX61B size 0, installing a braking resistor does not affect the dimensions. Therefore, MOVIDRIVE® MDX61B size 0 dimensions are displayed without an installed braking resistor.

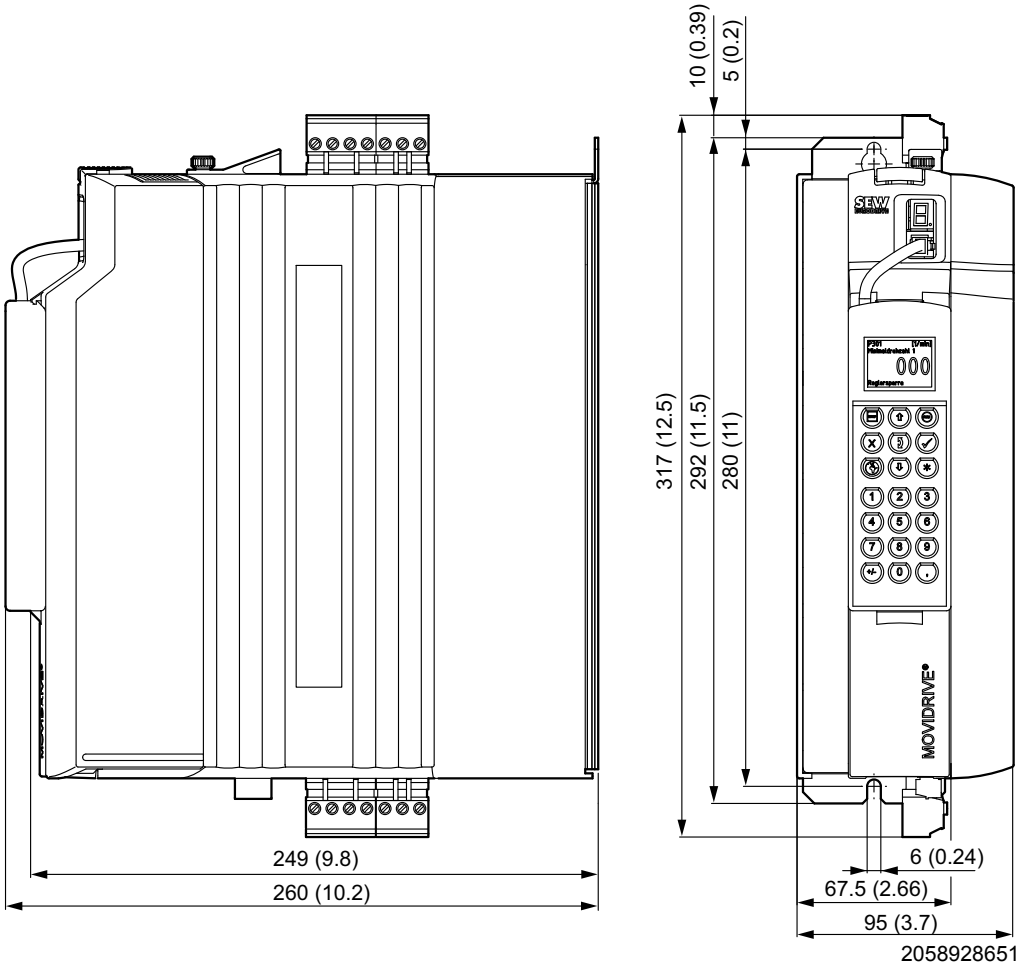
8.7.1 Size 0S

The following dimension drawing shows MDX61B size 0S, dimensions in mm (in)



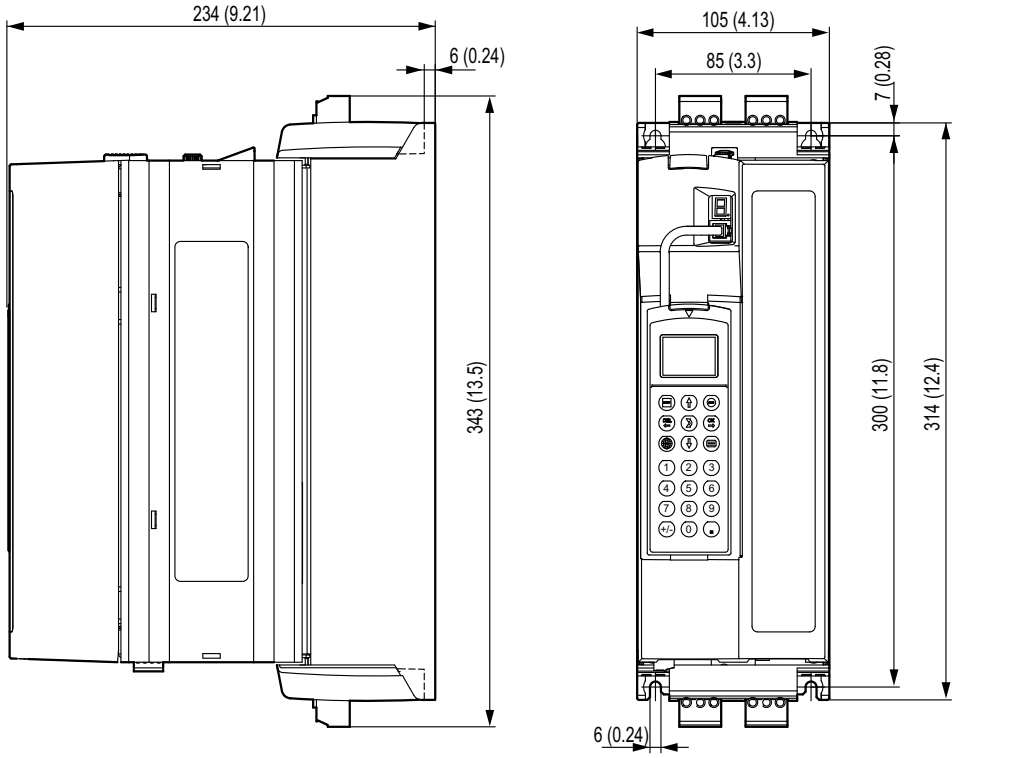
8.7.2 Size 0M

The following dimension drawing shows MDX61B size 0M, dimensions in mm (in)



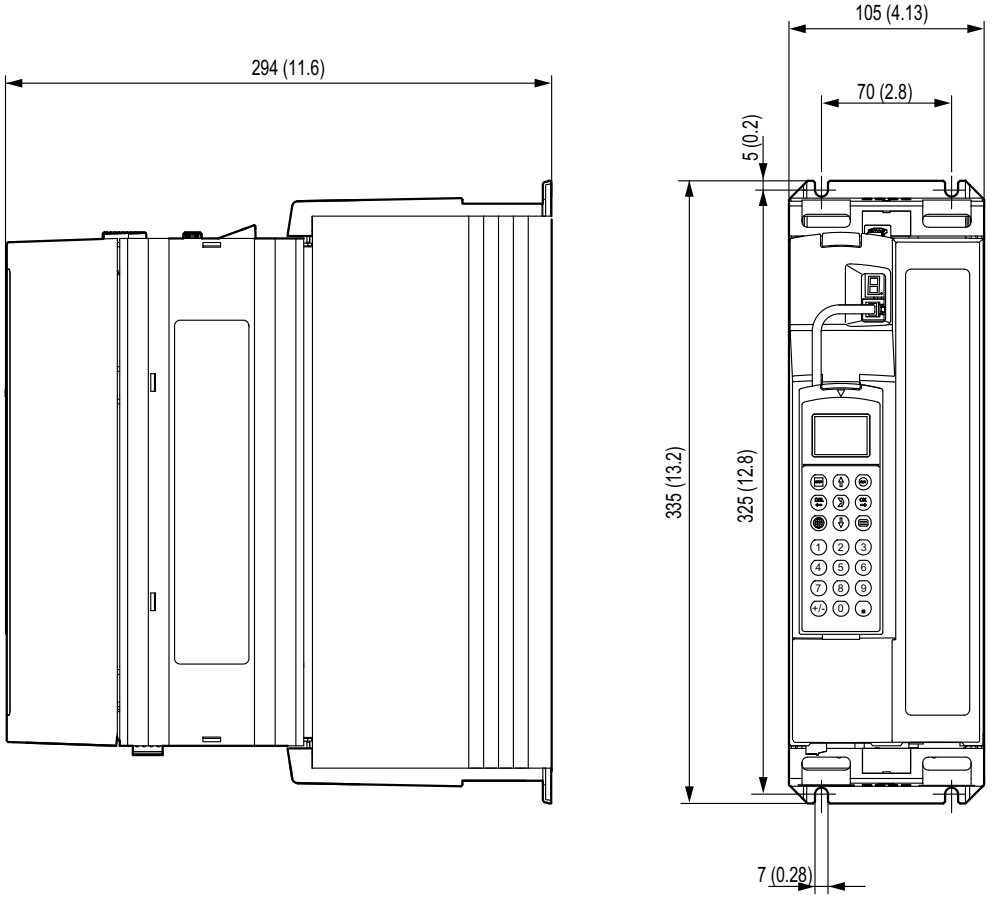
8.7.3 Size 1

The following dimension drawing shows MDX61B size 1, dimensions in mm (in)



8.7.4 Size 2S

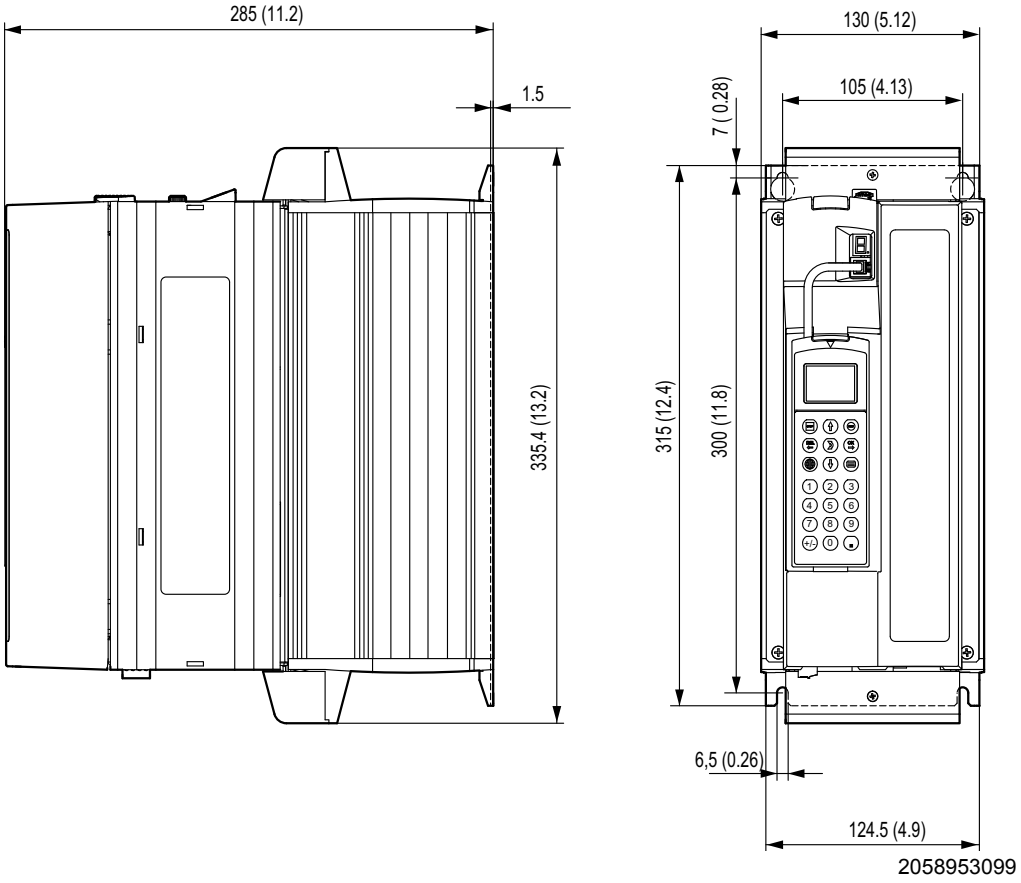
The following dimension drawing shows MDX61B size 2S, dimensions in mm (in)



2058949003

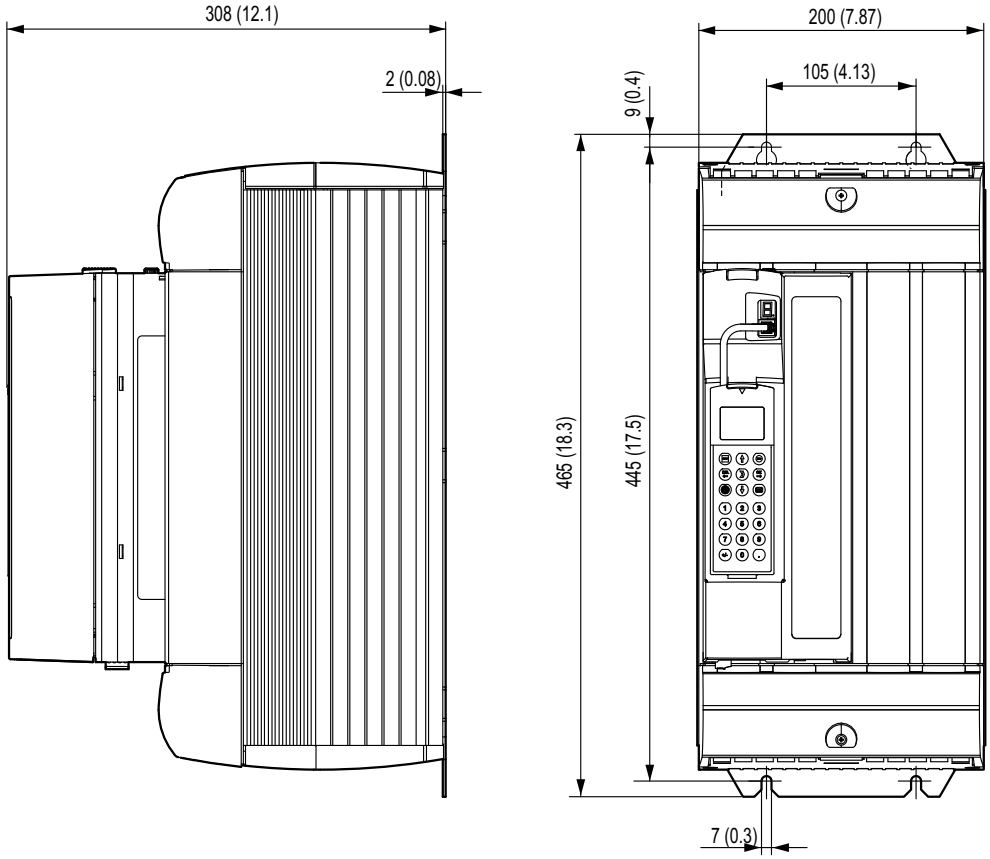
8.7.5 Size 2S

The following dimension drawing shows MDX61B size 2, dimensions in mm (in)



8.7.6 Size 3

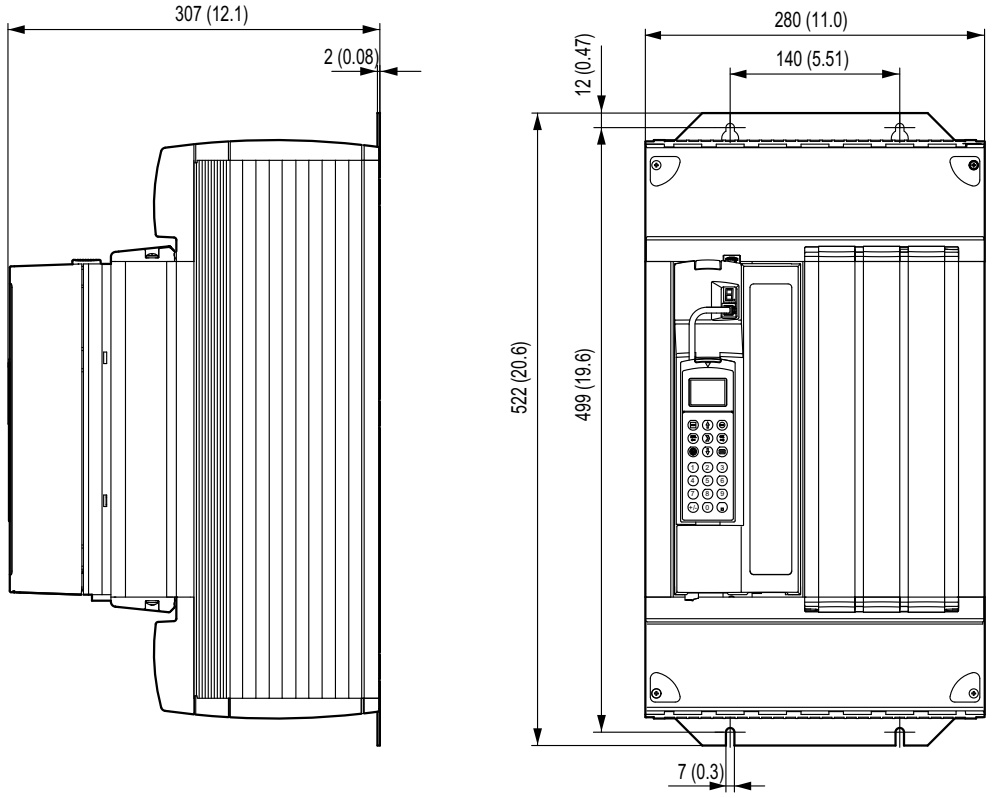
The following dimension drawing shows MDX61B size 3, dimensions in mm (in)



2058956683

8.7.7 Size 4

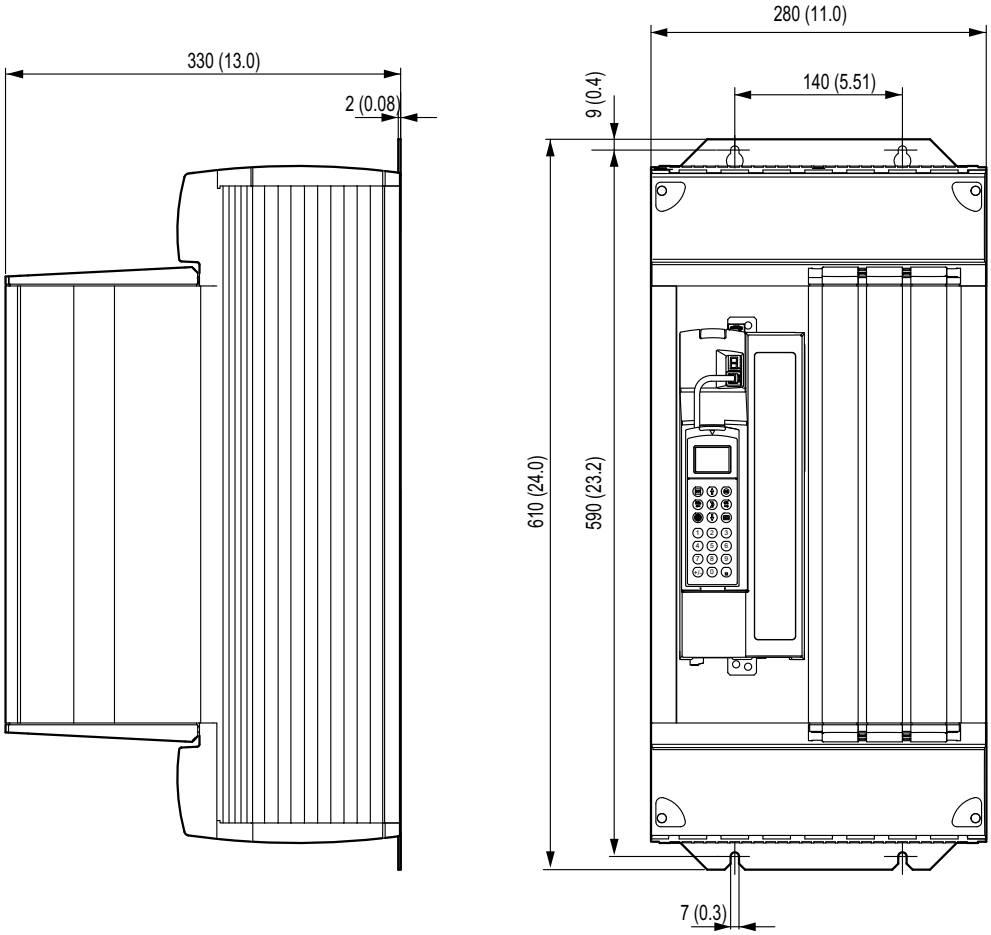
The following dimension drawing shows MDX61B size 4, dimensions in mm (in)



2058960267

8.7.8 Size 5

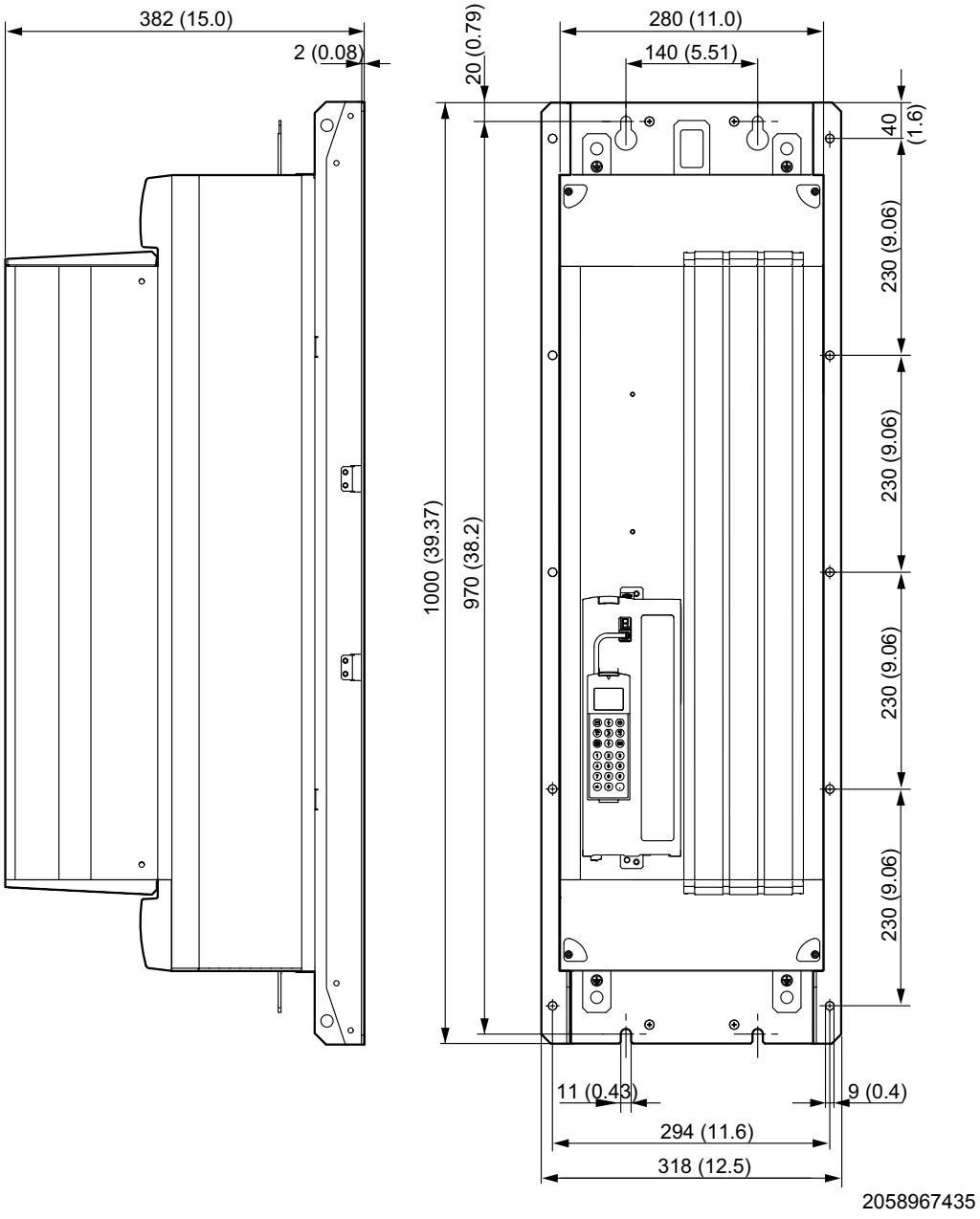
The following dimension drawing shows MDX61B size 5, dimensions in mm (in)



2058963851

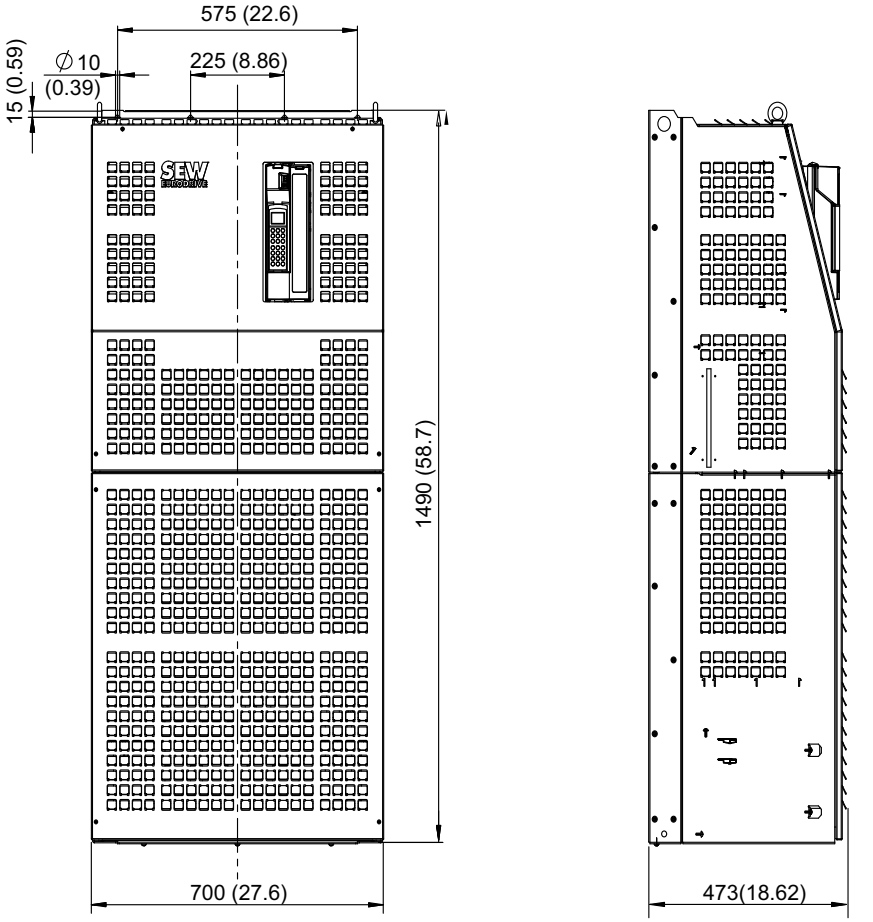
8.7.9 Size 6

The following dimension drawing shows MDX61B size 6, dimensions in mm (in)



8.7.10 Size 7

The following dimension drawing shows MDX61B size 7, dimensions in mm (in)



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8.8 Technical data for options DEH11B, DEH21B, DEU21B, DER11B, BW...-T/...-P

8.8.1 "HIPERFACE® encoder card type DEH11B" option

Option DEH11B			
2058970635	Output for incremental encoder simulation or Input for external encoder X14:	Output for incremental encoder simulation: Signal level to RS422 The number of pulses at X14 corresponds to the number of pulses at X15 motor encoder input	External encoder input (max. 200 kHz): Permitted encoder types: • HIPERFACE® encoder • sin/cos encoder AC 1 V_{pp} • TTL encoder with negated tracks • Encoder with signal level to RS422 Encoder power supply: • DC+12 V[1] (tolerance range DC 10.5 - 13 V) • I_{max} = DC 650 mA
	Motor encoder input X15:	Permitted encoder types: • HIPERFACE® encoder • sin/cos encoder AC 1 V_{pp} • TTL encoder with negated tracks • Encoder with signal level to RS422 • Permitted PPR count: 128/256/512/1024/2048 Encoder power supply: • DC+12 V[1] (tolerance range DC 10.5 - 13 V) • I_{max} = DC 650 mA	

1) Total current load of DC 12 V encoder supply ≤ DC 650 mA.

8.8.2 "Encoder card type DEH21B" option

DEH21B option		
2058987019	Encoder input X62:	SSI encoder input
	Motor encoder input X15:	Permitted encoder types: • HIPERFACE® encoder • sin/cos encoder AC 1 V_{pp} • TTL encoder with negated tracks • Encoder with signal level to RS422 • Permitted PPR count: 128/256/512/1024/2048 Encoder power supply: • DC+12 V[1] (tolerance range DC 10.5 - 13 V) • I_{max} = DC 650 mA
	External power supply connection X60:	24VIN: DC 24 V power supply for encoder connected to X62

1) Total current load of DC 12 V encoder supply ≤ DC 650 mA.

8.8.3 "Encoder card type DEU21B" option

DEU21B option		
	External encoder connection X14: **Output for incremental encoder simulation:** • Signal level to RS422 • The number of pulses is the same as on X15 motor encoder input	Permitted encoder types: • HIPERFACE® encoders • sin/cos encoder AC 1 V_{pp} • CANopen encoder • TTL encoder with negated tracks • HTL encoder • SSI encoder • SSI combination encoder • EnDat encoder • Encoder with signal level to RS422 • Permitted PPR count: 2-4096 increments Encoder power supply: • DC 24 V encoder supply[1)] • DC 24 V encoder supply[1)]
	Motor encoder connection X15:	Permitted encoder types: • HIPERFACE® encoders • sin/cos encoder AC 1 V_{pp} • TTL encoder with negated tracks • HTL encoder • SSI encoder • SSI combination encoder • EnDat encoder • Encoder with signal level to RS422 • Permitted PPR count: 2-4096 increments Encoder power supply: • DC 24 V voltage supply[1)] • DC 12 V voltage supply[1)]

1) The maximum load on X14:13 and X15:13 is DC 650 mA in total. If the overall unit load on the 24 V level exceeds 400 mA, you must connect an external DC 24 V supply to X10:9/X10:10. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual.

8.8.4 "Resolver card type DER11B" option

DER11B option			
 2058990603	Output for incremental encoder simulation or external encoder input X14:	Output for incremental encoder simulation: Signal level to RS422 The number of pulses is 1024 pulses/revolution	External encoder input (max. 200 kHz): Permitted encoder types: • HIPERFACE® encoder • sin/cos encoder AC 1 V_{pp} • TTL encoder with negated tracks Encoder power supply: • DC+12 V[1)] (tolerance range DC 10.5 - 13 V) • I_{max} = DC 650 mA
	Motor encoder input X15:	Resolver 2-pole, U_{ref} = AC 7 V_{eff}, 7 kHz U_{in} / U_{ref} = 0.5	

1) Total current load of DC 12 V encoder supply ≤ DC 650 mA.

8.8.5 "BW...-T / BW...-P braking resistor" option

BW...-T / BW...-P braking resistor	
Connection cross section for signal contact	1 x 2.5 mm^2
Switching capability of the thermostat's signal contact	• DC 2 A / DC 24 V (DC11) • AC 2 A / AC 230V (AC11)
Switching contact	According to EN 61800-5-1

8.9 Technical data of DIO11B and DFC11B options

8.9.1 "Input/output card type DIO11B" option

Option DIO11B			
2058995467	Setpoint input n2 X20:1/X20:2		AI21/AI22: Voltage input Differential input or input with AGND reference potential
	AI21/AI22 operating mode		n2 = DC 0...+10 V or DC -10 V...0...+10 V
	Resolution		12 bit, sampling time 1 ms
	Internal resistance		R_i > 40 kΩ
	Analog outputs X21:1/X21:4		AOV1/AOV2: Voltage outputs DC-10 V...0...+10 V, I_{max} = DC 10 mA, short-circuit proof and protected against external voltage to DC 30 V, selection option → parameter menu P64_
	X21:2/X21:5		AOC1/AOC2: Current outputs DC 0(4)...20 mA, short-circuit proof and protected against external voltage to DC 30 V, selection option → parameter menu P64_
	Response time		5 ms
	Resolution		12 bit
	Binary inputs X22:1...X22:8		Isolated (optocoupler), PLC compatible (EN 61131) DI1Ø...DI17
	Internal resistance		R_i ≈ 3 kΩ, I_E ≈ DC 10 mA Sampling interval 1 ms
	Signal level	DC+13 V...+30 V= "1" = Contact closed DC –3 V...+5 V = "0" = Contact open	Complies with EN 61131
	Function X22:1...X22:8		DI10...DI17: Selection option → Parameter menu P61_
	Binary outputs X23:1...X23:8		DO1Ø...DO17: PLC-compatible (EN 61131-2), response time 1 ms
	Signal level		"0" = DC 0 V "1" = DC+24 V
	Function X23:1...X23:8		DO10...DO17: Selection option → Parameter menu P63_, I_{max} = DC 50 mA, short-circuit proof and protected against external voltage to DC 30 V
	Reference terminals X20:3/X21:3/ X21:6 X22:9 X22:10		AGND: Reference potential for analog signals (AI21/AI22/AO_1/AO_2) DCOM: Reference potential for binary inputs X22:1...X22:8 (DI1Ø...DI17) DGND: Reference potential for binary signals, reference potential for DC 24 V supply
	Voltage input X23:9		24VIN: Supply voltage DC +24 V for binary outputs DO1Ø...DO17
	Permitted line cross section		One core per terminal: 0.08...1.5 mm^2 (AWG 28...16) Two cores per terminal: 0.25...1 mm^2 (AWG 22...17)

8.9.2 "CAN-Bus interface type DFC11B" option

DFC11B option		
2058998539	Communication profile	• SEW-MOVILINK® • CANopen • CAN Layer 2
	Number of process data words	1 ... 10 process data words
	Baud rate	Setting using parameter P894: 125 kbaud / 250 kbaud / 500 kbaud / 1 Mbaud
	Connection technology	Sub-D9 plug connector X30 (plug assigned to CIA standard) or via terminal X31
	Permitted line cross section X31 (CAN-Bus connection)	One core per terminal: 0.20 ... 2.5 mm^2 (AWG24 ... 12) Two cores per terminal: 0.25 ...1 mm^2 (AWG22 ... 17)
	Terminating resistor	120 Ω (set using DIP switch S1-R)
	Addressing	Setting via parameter P891 (SBus MOVILINK) or P896 (CANopen)
	Tools for startup	• MOVITOOLS® MotionStudio software • DBG60B keypad

9 Declarations of Conformity

9.1 MOVIDRIVE®

EC Declaration of Conformity

SEW EURODRIVE

900230010

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

frequency inverters of the series	**MOVIDRIVE® B**	
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
Low Voltage Directive	**2006/95/EC**	
EMC Directive	**2004/108/EC**	**4)**
applied harmonized standards	**EN 13849-1:2008** **EN 61800-5-1:2007** **EN 61800-3:2007**	**5)**

1) These products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.

5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

Bruchsal	11.12.09	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

9.2 MOVIDRIVE® with DFS11B/DFS21B

EC Declaration of Conformity

SEW EURODRIVE

900010010

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

frequency inverters of the series	**MOVIDRIVE® B**	
with built-in	**DFS11B** **DFS21B**	**PROFIsafe®** **PROFIsafe®**
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
Low Voltage Directive	**2006/95/EC**	
EMC Directive	**2004/108/EC**	**4)**
applied harmonized standards	**EN 13849-1:2008** **EN 62061: 2006** **EN 61800-5-1:2007** **EN 61800-3:2007**	**5)**

1) These products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.

5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

Bruchsal	11.12.09	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

9.3 MOVIDRIVE® with DCS21B/DCS31B

EC Declaration of Conformity

SEW EURODRIVE

900020010

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Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

frequency inverters of the series	**MOVIDRIVE® B**	
with built-in	**DCS21B** **DCS31B**	**PROFIsafe®**
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
Low Voltage Directive	**2006/95/EC**	
EMC Directive	**2004/108/EC**	**4)**
applied harmonized standards	**EN 13849-1:2008** **EN 61800-5-1:2007** **EN 61800-3:2007**	**5)**

1) These products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.

5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

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Place	Date	Managing Director Technology	a) b)

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Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brüssel**	**SEW Caron-Vector** Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be
Service Competence Center	**Industrial Gears**	**SEW Caron-Vector** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
	Antwerp	**SEW Caron-Vector** Glasstraat, 19 BE-2170 Merksem	Tel. +32 3 64 19 333 Fax +32 3 64 19 336 http://www.sew-eurodrive.be service-antwerpen@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew- eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew- eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478398 Fax +86 27 84478388
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 88241718 Fax +86 29 68686296 logistic-xa@sew-eurodrive.cn

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
Technical Offices	**Brno**	SEW-EURODRIVE CZ S.R.O. Křenová 52 CZ -60200 Brno	Tel. +420 543 256 151 +420 543 256 163 Fax +420 543 256 845
	Hradec Králové	SEW-EURODRIVE CZ S.R.O. Čechova 498 CZ-50202 Hradec Králové	Tel. +420 495 510 141 Fax +420 495 521 313
	Plzeň	SEW-EURODRIVE CZ S.R.O. Areal KRPA a.s. Zahradni 173/2 CZ-32600 Plzeň	Tel. +420 378 775 300 Fax +420 377 970 710
	Ostrava	SEW-EURODRIVE CZ S.R.O. Studenská 6202/17 CZ-708 00 Ostrava-Poruba	Tel. +420 738 339 044 Mobile +420 724 889 965

Czech Republic			
	Klatovy	SEW-EURODRIVE CZ S.R.O. Technická kancelář Klatovy Domažlická 800 CZ-33901 Klatovy	Tel. +420 376 310 729 Fax +420 376 310 725

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg
Service	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah **United Arabian Emirates**	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Technical Offices	**Helsinki**	SEW-EURODRIVE OY Luutnantintie 5 FIN-00410 Helsinki	Tel. +358 201 589-300 Fax + 358 9 5666-311 sew@sew.fi
	Vaasa	SEW-EURODRIVE OY Hietasaarenkatu 18 FIN-65100 Vaasa	Tel. +358 201 589-300 Fax +358 6 3127-470 sew@sew.fi
	Rovaniemi	SEW-EURODRIVE OY Valtakatu 4 A FIN-96100 Rovaniemi	Tel. +358 201 589-300 Fax +358 201 589-239 sew@sew.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Great Britain			
Technical Offices	**London**	SEW-EURODRIVE Ltd. 764 Finchely Road, Temple Fortune GB-London N.W.11 7TH	Tel. +44 20 8458-8949 Fax +44 20 8458-7417
	Midlands	SEW-EURODRIVE Ltd. 5 Sugar Brook court, Aston Road, Bromsgrove, Worcs B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245
	Scotland	SEW-EURODRIVE Ltd. Scottish Office No 37 Enterprise House Springkerse Business Park GB-Stirling FK7 7UF Scotland	Tel. +44 17 8647-8730 Fax +44 17 8645-0223
	Northern Ireland	Heyn Engineering (NI) Ltd. 1 Corry Place, Belfast, BT3 9AH	Tel. +44 02890350022 Fax +44 02890350012 info@heyn.co.uk http://www.heyn.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Technical Office	**Thessaloniki**	Christ. Boznos & Son S.A. Asklipiou 26 562 24 Evosmos, Thessaloniki	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

Iceland			
Sales	**Reykjavik**	Vélaverk ehf. Bolholti 8, 3h. IS - 105 Reykjavik	Tel. +354 568 3536 Fax +354 568 3537 velaverk@velaverk.is

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 c.v.shivkumar@seweurodriveindia.com

India			
Technical Offices	**Ahmedabad**	SEW-EURODRIVE India Private Limited 306, Shaan office complex, Behind Sakar-IV, Ellisebridge, Ashram Road Ahmedabad – Gujarat	Tel. +91 79 40072067/68 Fax +91 79 40072069 bankim.barot@seweurodriveindia.com
	Bengaluru	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bengaluru - 560052 - Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveindia.com ganesh@seweurodriveindia.com
	Chandigarh	SEW EURODRIVE India Private Limited Sujit Kumar Mishra H.No.5464/3 Modern Housing Complex Manimajra Chandigarh -160101	Tel. +91 9878469579 Fax +91 1722738664 saleschand@seweurodriveindia.com
	Chennai	SEW-EURODRIVE India Private Limited 2nd Floor, Josmans Complex, No. 5, McNichols Road, Chetpet Chennai - 600031 - Tamil Nadu	Tel. +91 44 42849813 Fax +91 44 42849816 saleschen@seweurodriveindia.com c.v.shivkumar@seweurodriveindia.com
	Coimbatore	SEW-EURODRIVE India Private Limited Office No 60 Arpee Centre (Opp Annapoorna Hotel) 420 N, NSR Road, Saibaba Colony Coimbatore 641 0111 - Tamil Nadu	Tel. +91 422 2455420 Fax +91 422 2443988 salescmb@seweurodriveindia.com p.selvakumar@seweurodriveindia.com
	Cuttack	SEW-EURODRIVE India Private Limited Plot No.- 1764, Nuasahi, Nayapalli Bhubaneswar-12 Orissa	Tel. +91 9937446333 manoranjan.sahoo@seweurodrivein-dia.com
	Hyderabad	SEW-EURODRIVE India Private Limited 408, 4th Floor, Meridian Place Green Park Road Amerpeet Hyderabad - 500016 - Andhra Pradesh	Tel. +91 40 23414698 Fax +91 40 23413884 saleshyd@seweurodriveindia.com ma.choudary@seweurodriveindia.com
	Jamshedpur	SEW-EURODRIVE India Private Limited Flat No.: B/2, B.S. Apartment Road No.: 4, Contractor's area, Bistupur Jamshedpur 831 001 - Chhattisgarh	Tel. +91 9934123671 siddaratha.mishra@seweurodrivein-dia.com
	Kolkata	SEW EURODRIVE India Private Limited 2nd floor, Room No. 35 Chowringhee Court 55, Chowringhee Road Kolkata - 700 071 - West Bengal	Tel. +91 33 22827457 Fax +91 33 22894204 saleskal@seweurodriveindia.com a.j.biswas@seweurodriveindia.com
	Lucknow	SEW-EURODRIVE India Private Limited 69, Shiv Vihar Colony Vikas Nagar-5 Lucknow 226022 - Uttar Pradesh	Tel. +91 9793627333 amit.nigam@seweurodriveindia.com
	Madgaon	SEW-EURODRIVE India Private Limited Flat No.-G1, Shivas-Laxmi Prasad Co-Operative Housing Society, Padmanarayan Estate, Near Jivottaam Math, Gagole Madgao, Goa - 403 602	samrat.chakravorty@seweurodrivein-dia.com

India			
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza, J.B. Nagar, Andheri Kurla Road, Andheri (E) Mumbai - 400059 - Maharashtra	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com p.s.ray@seweurodriveindia.com
	New Delhi	SEW-EURODRIVE India Private Limited 418-419, Suneja Tower-1 District Centre, Janak Puri New Delhi 110 058	Tel. +91 11 25544111 Fax +91 11 25544113 salesdelhi@seweurodriveindia.com vikram.juneja@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Lunawat Prism 4th floor, S. No. 148, Neena Co-Operative Housing Society, Paud Road, Pune 411038 - Maharashtra	Tel. +91 20 25380730 / 735 Fax +91 20 25380721 salespune@seweurodriveindia.com praveen.hosur@seweurodriveindia.com
	Raipur	SEW-EURODRIVE India Private Limited A-42, Ashoka Millenium Complex, Ring Road-1, Raipur 492 001 - Chhattisgarh	Tel. +91 771 4090765 Fax +91 771 4090765 sutanu.sarkar@seweurodriveindia.com

Indonesia			
Represented by	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Technical Offices	**Bologna**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 I-40064 Ozzano dell'Emilia (Bo)	Tel. +39 051 65-23-801 Fax +39 051 796-595
	Caserta	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 I-81020 S. Nicola la Strada (Caserta)	Tel. +39 0823 219011 Fax +39 0823 421414
	Pescara	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Europa,132 I-65010 Villa Raspa di Spoltore (PE)	Tel. +39 085 41-59-427 Fax +39 085 41-59-643
	Torino	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C I-10135 Torino	Tel. +39 011 3473780 Fax +39 011 3473783
	Verona	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via P. Sgulmero, 27/A I-37132 Verona	Tel. +39 045 89-239-11 Fax +39 045 97-6079

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Technical Offices	**Fukuoka**	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	Osaka	SEW-EURODRIVE JAPAN CO., LTD. Higobashi Shimizu Bldg. 10th flor 1-3-7 Tosabori, Nishi-ku Osaka, 550-0001	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp
	Tokyo	SEW-EURODRIVE JAPAN CO., LTD. Omarimon Yusen Bldg. 13th floor 3-23-5 Nishinbashi, Minato-ku Tokyo 105-0003	Tel. +81 3 3239-0469 Fax +81 3 3239-0943 sewtokyo@basil.ocn.ne.jp

Kazakhstan			
Sales	**Almaty**	SEW-EURODRIVE LLP Raimbek Ave. 348 KZ-050061 Almaty	Tel.+7 (727) 334 1880 Fax +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr
Technical Offices	**Daegu**	SEW-EURODRIVE KOREA Co., Ltd. No.1108 Sungan officetel 87-36, Duryu 2-dong, Dalseo-ku Daegu 704-712	Tel. +82 53 650-7111 Fax +82 53 650-7112
	DaeJeon	SEW-EURODRIVE KOREA Co., Ltd. No. 1502, Hongin officetel 536-9, Bongmyung-dong, Yusung-ku Daejeon 305-301	Tel. +82 42 828-6461 Fax +82 42 828-6463
	Kwangju	SEW-EURODRIVE KOREA Co., Ltd. 4fl., Dae-Myeong B/D 96-16 Unam-dong, Buk-ku Kwangju 500-170	Tel. +82 62 511-9172 Fax +82 62 511-9174
	Seoul	SEW-EURODRIVE KOREA Co., Ltd. No.504 Sunkyung officetel 106-4 Kuro 6-dong, Kuro-ku Seoul 152-054	Tel. +82 2 862-8051 Fax +82 2 862-8199

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 ssacar@inco.com.lb
	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 philipppe.acar@medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Technical Offices	**Kota Kinabalu**	SEW-EURODRIVE Sdn Bhd (Kota Kinabalu Branch) Lot No. 2,1st Floor, Inanam Baru Phase III, Miles 5.1 /2, Jalan Tuaran, Inanam 89350 Kota Kinabalu Sabah, Malaysia	Tel. +60 88 424792 Fax +60 88 424807
	Kuala Lumpur	SEW-EURODRIVE Sdn. Bhd. No. 2, Jalan Anggerik Mokara 31/46 Kota Kemuning Seksyen 31 40460 Shah Alam Selangor Darul Ehsan	Tel. +60 3 5229633 Fax +60 3 5229622 sewpjy@po.jaring.my
	Kuching	SEW-EURODRIVE Sdn. Bhd. Lot 268, Section 9 KTLD Lorong 9, Jalan Satok 93400 Kuching, Sarawak East Malaysia	Tel. +60 82 232380 Fax +60 82 242380
	Penang	SEW-EURODRIVE Sdn. Bhd. No. 38, Jalan Bawal Kimsar Garden 13700 Prai, Penang	Tel. +60 4 3999349 Fax +60 4 3999348 seweurodrive@po.jaring.my

Mauritania			
Sales	**Zouérate**	AFRICOM - SARL En Face Marché Dumez P.B. 88 Zouérate	Tel. +222 54 40134 Fax +222 54 40538 cybertiris@mauritel.mr

Mexico			
Assembly **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 522618372 Fax +212 522618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu
		VECTOR Aandrijftechniek B.V. Gelderhorst 10 NL-7207 BH Zutphen Industrieterrein de Revelhorst	Tel. +31 575 57 44 94 Fax +31 575 57 24 43 oost@vector.nu
		VECTOR Aandrijftechniek B.V. Mercuriusweg 8A NL-5971 LX Grubbenvorst	Tel. +31 77 36 61 873 Fax +31 77 36 62 109 zuid@vector.nu
		VECTOR Aandrijftechniek B.V. Weberstraat 74 NL-1446 VV Purmerend Industrieterrein "De Baanstee"	Tel. +31 299 66 63 38 Fax +31 299 47 60 55 noordwest@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Technical Office	**Palmerston North**	SEW-EURODRIVE NEW ZEALAND LTD. C/-Grant Shearman, RD 5, Aronui Road Palmerston North	Tel. +64 6 355-2165 Fax +64 6 355-2316 sales@sew-eurodrive.co.nz

Norway			
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